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May, 1941

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It is cool running*			
Temperature rise on Goodrich flexometer	32°C.	24°C.	24°C.
It stays cool running*			
Temperature rise on Goodrich flexometer			
After aging 35 days 70°C. air oven	28°C.	24°C.	22°C.
After aging 14 days 70°C. Oxygen Bomb	Blew out	120°C.	46°C.
It has high modulus* (stress at 500% elongation psi)	1000	1400	1300
It has high tear resistance* (pounds)	10	24	25
It resists aging*			
% tensile strength retained after 28 days in 70°C. Oxygen Bomb	25%	42%	63%
% tensile strength retained after 4 days in 100°C. oven	17%	13%	29%
It is good when hot*			
Tensile Strength @ 100°C.	3500	3600	3900
Tear Resistance @ 100°C.	8	8	12

*Cured 60 min. @ 267°F.

IT IS THE LEAST BRITTLE WHEN HOT

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Smoked Sheets	100.	100.	100.
Zinc Oxide	50.	50.	50.
Stearic Acid	1.5	1.5	1.5
Pine Tar	1.	1.	1.
NEOZONE D	0.5	0.5	0.5
THERMOFLEX A	1.	1.	1.
Sulfur	2.75	2.75	2.75
2-MT	—	—	0.6
ACCELERATOR 808	—	—	0.05
ACCELERATOR No. 8	—	1.	—
ZENITE	—	0.4	—
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1. Higher modulus with less combined sulfur.
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For further details see 2-MT Report 41-1

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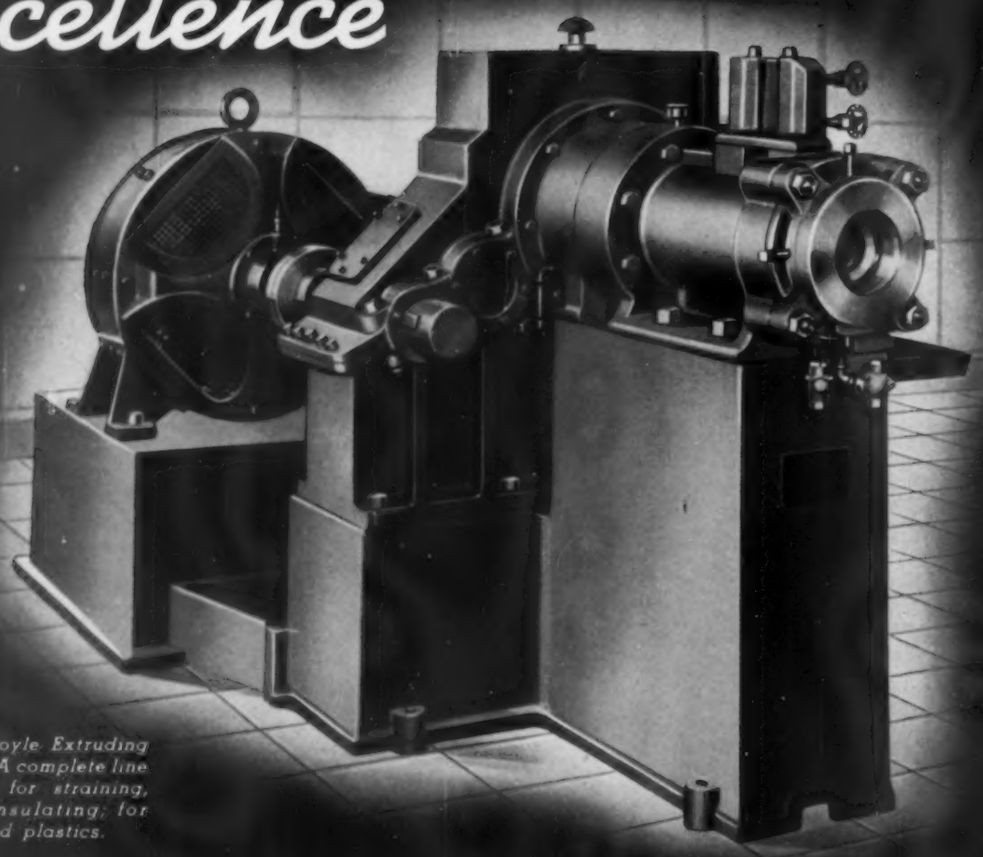

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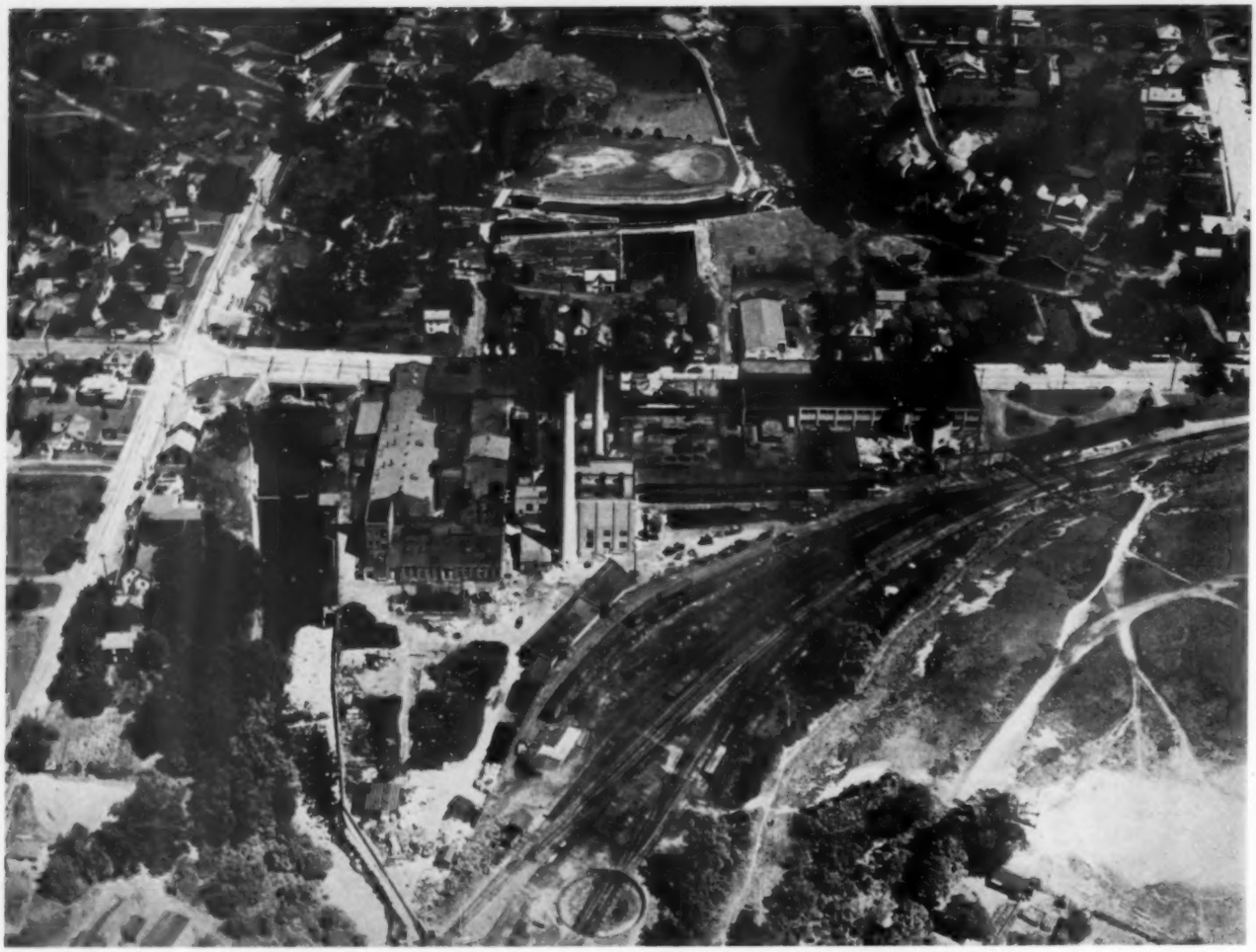

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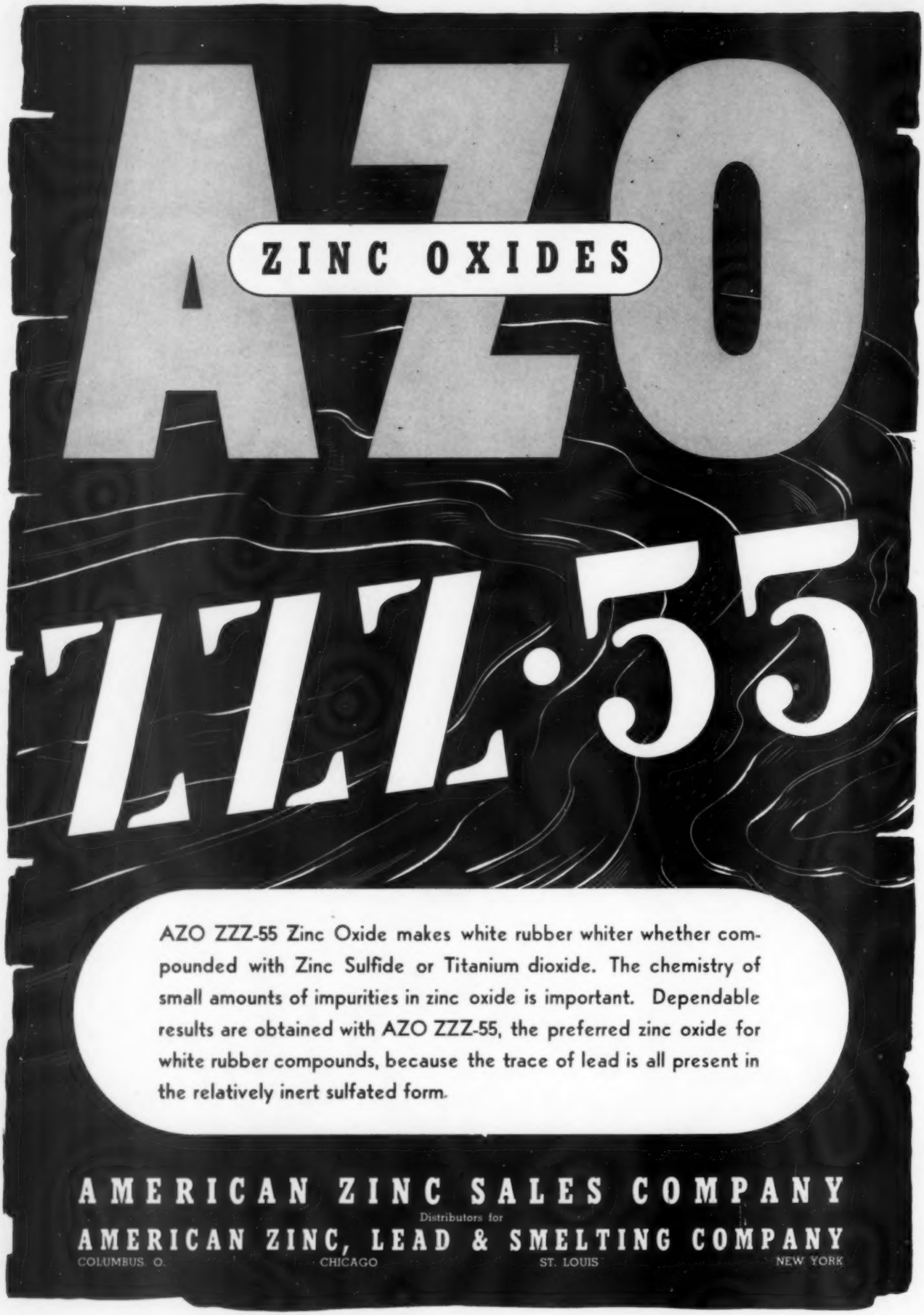
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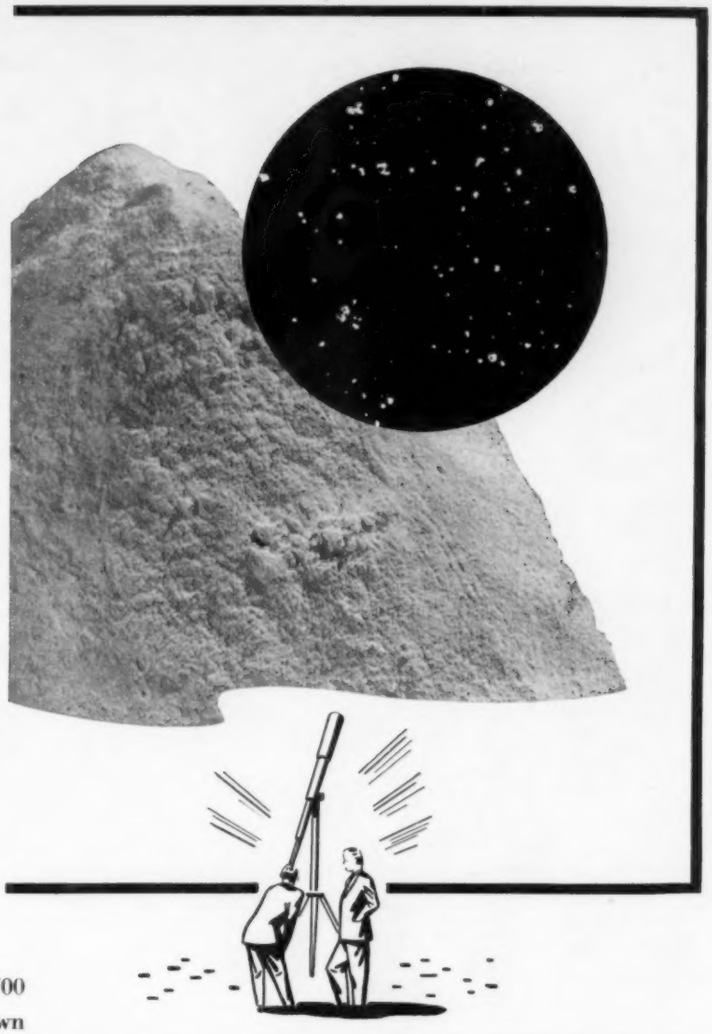

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Tensile strength $/in²	3700	4285
Stress $/in² @ 500%	1510	2220
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NUMBER 2

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Compiled by D. E. Cable, Ph.D.
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By Frederick Marchionna
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The **RUBBER AGE**

VOL. 49, No. 2 **MAY, 1941**

The Manufacture of High-Speed Endless-Woven Rubber Belts

By BURT W. WETHERBEE

Head of Development Laboratory, Globe Woven Belting Co.

THE transmission of power from the prime mover to the tool has become one of the critical factors of the design and operation of our modern machine industry. It has become critical because modern industrial processes require a flow of power free from vibrations and maintained at a very high unfluctuating rate.

For reasons that will be discussed later, the high speed woven endless belt construction has emerged as the best means of transmitting power, under these conditions, from the prime mover to the tool. And yet, one will look in vain through the industrial literature for any discussion of the use of these belts. Production speeds, types of cutters and grinders, synchronization of tool movement—all these and many another related subject are frequently treated at length, but the important link between the tool and the source of power is given either a passing, inadequate notice or is completely neglected. Even the machine designers sometimes leave the consideration of the drive until so late in the general design that the belt in operation has to undergo undue abuse.

With slow working speeds, comparatively little attention to the drive is needed. In this article, however, belt speeds under 3,000 feet per minute are not even being considered; here, the high speed drive is arbitrarily defined as operating between 3,000 and 20,000 feet per minute. It is somewhat more customary to relate the operating speed to the rotational velocity of the driven spindle and in this respect the former feet per minute become (with allowance for pulley diameter variations) 3,000 to 60,000 r.p.m.

The significance of the role played by the high speed machine and industrial tools under modern conditions is now being grasped to some extent even by the man in the street but for one to appreciate the startling changes in machine design and function, the panorama of progress would have to be carefully surveyed from the artisan or single stage operation to the present power age.

To state the highlights in the most succinct manner, the rate of speed at which precision work is done is the exponent of industrial progress. Accurate parts have been made sparingly and usually at great expense for centuries. Time waited for Eli Whitney to demonstrate that the key to mass production is interchangeability; that the price of interchangeability is precision; and finally, since the price of precision is time, that the ultimate solution is found in performing unit operations faster.

Yet, the really spectacular developments had to wait upon the simultaneous demands of the automobile and airplane industries and the demands of the first world war. Even then, the present power technology would

not have been ushered in were it not for the advent of electricity. The changes in machine design that resulted from the availability of power where and when wanted changed even the character of the flow of materials of production through the factory.

Definition of "Machine Tools"

Strictly speaking, all machines must be made by what are conventionally known as *machine tools*. According to the definition of the National Machine Tool Builders' Association, a machine tool is "a power driven, complete metal working machine not portable by hand, having one or more tool or work holding devices and used for progressively removing metal in the form of chips." Within this definition are included planers, borers, grinders, milling and turning machines. These are the basic machine tools. Increased accuracy in the work of industrial machines has been made possible largely because of increased accuracy of the machine tool itself. Lathe beds are now being made accurate to 1/40,000 of an inch. Gear cutters are today capable of cutting gears accurate to 1/10,000 of an inch.

Cemented carbide cutting tools have made it possible to "remove metal in the form of chips" fifty to one hundred times faster than was possible only a few years ago. Bearings and spindles have been refined to the point where they will support much greater loads and travel at five times the former speed. The machine has been made heavier or of alloy steels, either method eliminating vibration and allowing accurate work at higher speeds. Grinding wheels have not only been made to rotate much faster but are being made denser so that during just this one past year, the production from the race department of a ball bearing factory has been increased three-fold.

Most important of all, the machine has become a compact, self-contained unit, many times performing not simple drilling or grinding alone, but tremendously complicated finishing operations. The mushrooming spread of electricity as a kind of energy, conferring as it does the properties of adaptability and fluidity, has reversed the trend toward operation simplicity and has created the apparent paradox of increasing complexity of manufacture of even the simplest part. The answer is that our machines, motors and mechanical equipment do not really have "simplest" parts any more. The aviation industry more than any other has demonstrated the improved performance that results when tolerances of manufacturing are lessened from .001" to .0001".

The increased complexity and compactness of the modern machine have made short drives from motors to tools mandatory. Direct use of the motor shaft as the spindle or tool holder is used successfully in a few instances of relatively light service, but in the bulk of applications it is much more practical to take advantage of pulley ratios and increase the power of the motor. The air turbine is used for only fairly light work on account of its low load factor. These high speed drives have a few common features invariably met with and which must be respected. There is usually only limited space available for the belt; it therefore must be short. This concentrates the wear and load within a very short length (in one popular installation, 25 inches) and makes the frictional characteristics of the belt very important. In such short center distances as are frequently found, the arc of curvature or contact with the driven pulley or spindle is sometimes as little as 100°. The operating speeds and load factors of spindle bearings require that belt tension be held very low so that, perforce, the coefficient of friction of the belt surface must be very high.

At speeds of 10,000 to 15,000 feet per minute maintained for hundreds of hours, it should be superfluous to stress the necessity for near-perfect flexibility and balance. The perfect belt at high speeds "stands still" with hardly any movement discernible; an imbalance develops a visible flutter. The fluttering of the belt often indicates fluctuating power flow which through vibration in the tool will produce chatter marks on the work. The belts are further required to be free from stretch under operating tensions because of the small take-ups provided.

Like many another product which is now taken for granted in the industrial world, the truly endless high-speed belt had its origin in a part for the Model T Ford—the fan belt. Since those days the V-belt has replaced the flat belt for this and any other installation where relatively slow positive power transmission is required. Like the V-belt, the high-speed flat belt is functionally and constructionally endless, having been woven so on a power loom. The essentials of construction are simple but the manufacturing steps employed to keep the carcass uniform are detailed and precise.

The Manufacturing Process

All belts start with the manufacture on a power loom (Fig. 1) of cloth tubing made from comb peeler yarns whose counts are varied to produce the weight tubing desired. Generally, four different weights suffice for the range of belt weights required—further variations being secured by varying the number of plies in the assembling operation. The diameter of the tubing as made on the loom determines the circumference of the finished belt. Thus, the stock of tubing which must be on hand to cover a range of belt circumferences in fractions of inches from 10 inches to approximately 16 feet is unfortunately very large.

The filling, in reference to the weaving, becomes the load-carrying element or warp in the finished belt, therefore the cutter removes strips or rings around the tubing (Fig. 2). These strips are then folded longitudinally so that the folded edge in effect becomes a selvage. Two or more of these strips are then placed together and, under high speed multiple needles, are sewed at a rate as high as 4,000 lock stitches per minute. Although this rate is only occasionally reached, it is important that sewing speed be consistently high, for the total number of stitches mounts very fast into the thousands as the belt size increases. The operation of sewing (Fig. 3) not only completely locks the plies but eliminates the least tendency to wrinkle, buckle or bootleg. Any one of these faults would cause a pounding at high speeds on the spindle bearings equivalent in their effects to hammerblows. (Repairs to damaged spindle bearings or "heads" average from one to several hundreds of dollars.)

The finished carcass is then stretched to size on roll stretching devices or expanding drums. This step removes the shrink induced by the stitches and transfers the crimp to the non-load, or cross yarns. The carcass is ready at this point for the rubber application.

Through the type of manufacturing process, the belt

FIG. 1—The Power Loom.

FIG. 2—Removing Strips.

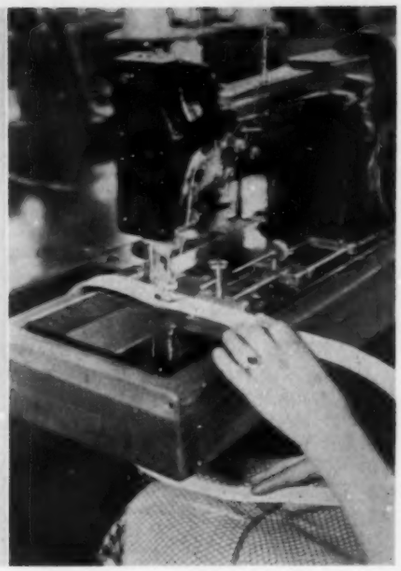


FIG. 3—Sewing Operation.

discussed above has come to be known as a "tubing" —or endless woven belt. A very interesting variation of the tubing belt, but also a truly endless belt, is designated in the trade as a "hand belt." The hand belt, as the name implies, is woven on a handloom. The weaving of each belt is a complete operation in itself with set-up, weaving, and finishing steps required for each belt. Although many experimental and semi-production power looms have been built for this particular kind of weaving, they invariably fail to be satisfactory for all but the very long belts because the slow set-up and finishing operations must still be performed by hand. With this manual factor always present, the small gain in the weaving phase makes the installation of power equipment less practical than would first appear.

Essentially, the hand belt is a circular warp whose circumference and width are those of the desired finished dimensions, across whose component yarn ends is woven a continuous filling. The weaving process continues until the warp is completely filled and the point of origin reached. Selvages are thus produced on both sides of the belt. It is somewhat interesting to note that the hand belt and the tubing belt are produced by exactly opposite manufacturing methods.

The hand belt is customarily woven in two types of structure; the plain-weave, in which there is but one ply, and the chevron or twill, in which the mass of circular warp is nearly doubled and the carcass assumes a two-ply effect. All types of the hand belt style combine extreme flexibility with great strength and their ability to carry heavy loads at very high speeds on small narrow pulleys has made their use a necessity on many of the ultra modern, ultra high-speed machines. The hand belt is handled from this point on in much the same manner as the tubing belt.

These belts are treated in many different ways subsequent to the manufacture of the carcass but since this discussion must limit itself to the applications of rubber, it will be impossible to describe the many interesting variations of the treating medium—how for high starting torques, such as those present in centrifuges, the surfaces of the treated belt must allow initial slip at the expense of a longer starting period; how a clutch action has been secured by treating a belt so that its coefficient of friction is sufficiently high to drive the tool but will allow the belt to slip in case of jamming.

Rubber in various forms has been used on these high-speed belts for a number of years. Previous to about fifteen years ago, when the availability of latex was not so easy nor its techniques of handling so well understood as at present, a standard formula for rubber cement to treat these belts was: one gallon benzene, one pound of well-milled rubber and one ounce of sulfur.

When latex became more readily available it was so obviously an easier material to handle in a factory process that it began to displace the former cement method. The latex process marked quite a step forward, but it was still crude. The manufacturer was presented with the dilemma of whether to use high solids or low. If low solids compounds were used it was impossible to achieve high frictional performance; if heavily loaded compounds (or even high rubber solids) were employed, the rubber soon rolled off in lumps and the user had, in effect, the carcass before it was rubberized.

These problems are still present but only to the extent of contradictions between conflicting properties desired in a single structure. Thus, certain types of yarns are desirable but resulting belt characteristics depend also on the best adhesion of the rubber. Certain types of weaves result in denser carcasses which allow higher load factors, but penetration of the rubber is a more acute problem. A belt should be as low as possible in flexural modulus, yet the high modulus rubber stocks which must be used for abrasion resistance inescapably promote "springiness."

Only since the period beginning less than ten years ago has there been a really adequate high-speed endless belt—a composite rubber and cotton structure,

available to the machine industry. Excepting only a few refinements in the carcass, this kind of belt has kept up with the steadily mounting demands of the high speed operators solely through the development of better rubber compounds and manufacturing techniques. As a trade name, this company's high speed products are known as "HiCoRed."

Dipping Is Best Practice

Because of the form, shape and character of the carcass, dipping procedures for treating the belts have so far proved to be most practical. Therefore, one is forced to choose between a cement type of process or the latex method. Since a good belt by present standards may be made with either form, the question of selection of method turns mainly upon advantages and disadvantages of manufacturing processes. A few words will help to point out some of the differences.

To produce the latex completely compounded for use, only reasonably simple equipment is required. There are no fire hazards, the solids content is uniform throughout use, and dipping is neat in addition to being uniform. The cement method is somewhat more complicated. If rapid cures are desired, the "A" and "B" batch method must be used; in dipping the belts into the cement, scraping off the viscous excess cement and drying, precautions against discharges of static electricity which might ignite or explode the solvent or its vapors must be taken. The belts must often be dipped as many as three times. If there is not a sufficiently heavy deposit to flow during the subsequent press vulcanization, surface abrasion in service will be inordinate.

On the other hand, in the case of equal percentages of rubber deposited from cement and latex, the flexural modulus of the cement type will be higher than that of the latex. Neoprene cements and latices are used for bad oil conditions, but usually the service life of the belt has been ended before the occasional small amounts of oil have had their effects.

After dipping, belts made by either method are carefully dried in warm air on stretching frames or drums so that on removal for press curing the length is substantially held by the stretching mechanism of the press yet without making this part of the curing equipment too unwieldy.

Presses have become specialized to the point where they are now built especially for the curing of the endless belt. Earlier, the conventional two-platen press

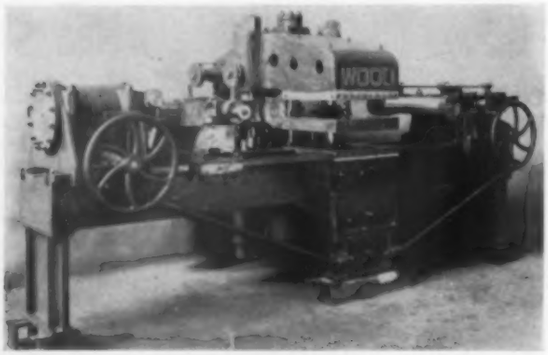


FIG. 4—Endless belt press. In curing HiCoRed belts smooth rolls replace the grooved ones seen.

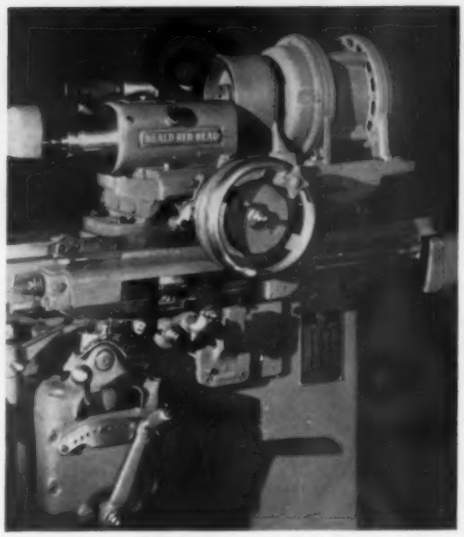


FIG. 5—The spindle speed of 38,000 r.p.m. reached by this Heald grinder is made possible by an endless belt.

was used, inserting between the platens a stretching frame which constituted the inner platen. A considerable number of interesting, but only partial, solutions to the press problems have been worked out. The large number of different sizes of belts introduces objections to what would be satisfactory solutions. With all its faults and lacks, the three-platen press (Fig. 4), with opposed rams and a floating middle platen, electrically heated and controlled, still prevails on account of its generality of function. The open front of this press does pose, however, some problems of design when pressures are used in the region of two hundred pounds per square inch.

Range of Curing Periods

By using highly accelerated compounds, cures can be kept within a short time range of three to eight minutes. Curing temperatures vary, of course, with the compounds used between 270° and 300° F. The problems connected with overcuring caused by the differences in circumferences of belts is the major difficulty in vulcanization practice and can be solved only by a continuous vulcanizing method.

Considering the developments of the past few years and the really outstanding improvements that have been made in the service life of these belts in the face of harsher work demands, it is interesting to note that almost all development work has been done directly in the field. It is almost impossible, and certainly uneconomical, to set up equipment in the laboratory which will approach the severity of service tests. Any standard testing machine fails to approximate the conditions under which these belts must operate.

The author's company has operated for some years a laboratory belt tester operating at a spindle speed of 18,000 to 22,000 r.p.m. Various attempts to put a constant and measurable load on this equipment have been unsuccessful; the unloaded belt will continue to run unchanged for weeks. By selecting certain types of production machines operating in the industry which

(Continued on page 105)

Equipment Adequacy

One of the fundamental principles of profitable production is equipment adequacy. A survey of nineteen rubber factories made by the author discloses that capacity operation is less profitable than when output is below capacity—if the equipment used is inadequate. Factual proof of this statement, in text and table form, is submitted. This analysis should give rubber manufacturers much food for thought.—The Editor.

By ARTHUR ROBERTS

PREPAREDNESS is an essential to all phases of activity, whether it be home defense or the manufacturing of rubber goods. It is estimated that the national income will jump to 80 billions in 1941; administration economists advise that defense appropriations will produce employment, such as this country has not known in years; the latest authenticated reports state that production has now passed the 1920's peak,—all of which means that the market places will again be crowded as in years BTSMC—before the stock market crash.

Rubber goods of all kinds will be purchased in increasing volume by individuals and governmental agencies. Despite the fact that "hairshirts", such as taxes and high labor costs, will increase production expense, it is worth noting that these same factors are producing a mammoth market for rubber goods. Your operating costs are higher but there is much more business floating around from which you can realize more net profit in dollars and cents—if you are adequately prepared. That "if" is a bigger barrier to the realization of maximum profits during the next few years than many managements suspect because our field studies disclose that a large percentage of rubber factories are not mechanically prepared for boom volume.

Instead of making more money on the substantial increase in sales volume that is already on the march, the managements of many rubber factories will hamstring themselves, unless they make adequate adjustments to the existing production set-up with bigger, speedier or additional units, able to handle an expansion program.

In agriculture, there is a law of diminishing returns. The farmer may revitalize the soil with crop rotation or other methods, but if he forces Nature beyond a certain point, the yield decreases instead of increases. The same thing holds true with machinery used in processing rubber goods. It has a normal profitable capacity. Force it beyond that point and the monetary returns decrease instead of increase. Our research work in this field indicates this very definitely.

In the November, 1939, issue of RUBBER AGE, the 21 factories reviewed averaged only 1.2 per cent net profit before modernization because the old equipment in use was controlled by the law of diminishing returns, otherwise, high operating costs for the yield in sales. Had these managements forced their old, inadequate machines to bigger output instead of modernizing, all of their factories would, sooner or later, have been in the red.

As it stood, 4 factories were in the red before modernization and the low average net profit indicated that the remaining 17 were in the danger zone because of old, inadequate equipment. They were saved only because they didn't get additional volume. It may sound fantastic to say that those rubber factories actually saved money by not getting more business, but remember that big volume won't assure big profits with inadequate equipment any more than low volume will assure profits with adequate equipment.

It isn't hard to get business these days but it will be hard to come through with worthwhile profits if your equipment is inadequate, old or under-sized. In such a case, your losses may increase as your volume increases beyond a certain point, similar to the law of diminishing returns in agriculture. This law, applied to the yield of processing equipment in the rubber factory, comes into razor-sharp focus today because of the step-up of business stimulated by defense appropriations, increased volume that will seep into every field, regardless of where the original expenditures occur.

Unless equipment is adequate, rubber factory executives will push their processing units beyond profitable capacity and begin to net losses instead of the gains they had hoped for with the bigger volume. It doesn't pay to operate old or new equipment to capacity. There should always be a margin of safety to keep production out of the danger zone.

Research has disclosed that plants operating up to peak capacity make less profit than when operating at practical capacity, which, in the rubber industry, will run, at this time, around 85 per cent of total capacity. Why? Because depreciation on machinery is much

STATEMENT A

Average sales, operating costs and net profit for 19 rubber factories using inadequate processing equipment in 1939.

Sales, less allowances, adjustments, returned goods, and other recorded allowances			$889,742.71 (100.0%)
Direct Factory Costs:			
Materials and production supplies, including losses on waste	$433,304.70	(48.7%)	
Direct labor, including set-up and change time, inspection, and testing	179,728.03	(20.2%)	
Total Direct Factory Costs	$513,032.73	(68.9%)	
Factory Overhead:			
Repairs and maintenance	$18,684.60	(2.1%)	
Heat, light, power and water	21,353.82	(2.4%)	
Depreciation and obsolescence on buildings, equipment, molds, dies, automotive equipment, insurance, taxes, interest, indirect labor, salaries and miscellaneous	98,761.44	(11.1%)	
Total Factory Overhead	$138,799.86	(15.6%)	
Commercial and Administration Expense:			
Bad debts, advertising, salaries, commissions, traveling expenses, factory warehouse and shipping expense, outside transportation, interest, office supplies, dues, outside auditing, legal services, inventory differences, breakage, samples, freight express, cartage, parcel post, obsolete finished goods losses, telegraph, telephone and miscellaneous	$110,328.10	(12.4%)	
TOTAL OVER-ALL COST			$862,160.69 (96.9%)
NET PROFIT ON OPERATIONS			$27,582.02 (3.1%)

higher, breakdowns occur more frequently, and errors, spoilage and rejects are more costly when workers and machines are pushed to the limit. Then, too, the quality of production is below par when plants are operated to total capacity and that hurts the company's prestige.

At this time, the subject of equipment adequacy is of paramount importance to rubber factories, because the plants operating with inadequate equipment will find their profits shrinking as business accelerates, as it is sure to do. To provide rubber factory executives with a yardstick with which to measure equipment adequacy and give them factual proof that equipment must be adequate to produce maximum profits, we selected 19 rubber factories of moderate size in the east which were using inadequate equipment in 1939 and which modernized adequately in 1940.

The before-and-after profit and loss statements accompanying this article are mute testimony to the profitableness of equipment adequacy. These plants, in anticipation of skyrocketing volume, installed equipment of a size, speed and efficiency able to handle it without straining a bolt or blowing a fuse. When studying these statements, remember that government spending until the latter part of 1940, had not stepped up industrial production to break-neck speed. The bigger output of these mills in 1941 and subsequent years will increase the profit yield instead of decreasing it, as would be the case had the inadequate machinery been retained.

In 1939, the average net profit was 3.1 per cent on sales, a better showing than the users of old equipment made on the previous modernization study, but whereas their extruders, curing presses and skiving machines were old, inefficient and obsolete, the equipment covered in the present study was efficient, some of it modern, but under-sized or in other ways inadequate. It had to be forced to supply demand, and with volume increasing it would not have been able to deliver required output in the days to come.

Some plants had modernized certain units, but they could not get top production because older equipment retained was a drag on the speedier new-comers. We find that this happens too often. Certain machines in a department are replaced, but other old machines, which must coordinate with the modern units, are left "as is"; thus, production is hampered by the "weak sisters". When you modernize, or "adequatize", replace all old or inadequate units with new or adequate equipment; otherwise, production will be below par and profits likewise.

For example, four factories reviewed on this survey had installed new extruding machines in 1939. These modern units did not produce top results because the cutters synchronizing with the extruders, measuring and cutting extruded stock as delivered, were old and inadequate. The old cutters weren't fast enough for the modern, super-speed extruders. When new cutters were installed in these four plants in 1940, the extruding machines automatically came into normal production stride, increasing output 25 per cent over 1939 operation.

Inadequacy is costly in normal times and in these days, when oil-gusher speed is the keynote, inadequate equipment, even a few machines here and there at strategic points, can put a piant at a disadvantage, to say the least.

STATEMENT B

Average sales, operating costs and net profit for the same 19 rubber factories after modernizing with adequate processing equipment in 1940.

Sales, less allowances, adjustments, returned goods, and other recorded allowances			$1,034,770.77	(100.0%)
Direct Factory Costs:				
Materials and production supplies, including losses on waste	$477,029.32	(46.1%)		
Direct labor, including set-up and change time, inspection and testing	202,815.07	(19.6%)		
Total Direct Factory Costs	$679,844.39	(65.7%)		
Factory Overhead:				
Repairs and maintenance	$19,660.64	(1.9%)		
Heat, light, power and water	18,625.87	(1.8%)		
Depreciation and obsolescence on buildings, equipment, molds, dies, automotive equipment, insurance, taxes, interest, indirect labor, salaries and miscellaneous	120,033.41	(11.6%)		
Total Factory Overhead	$158,319.92	(15.3%)		
Commercial and Administration Expense:				
Bad debts, advertising, salaries, commissions, traveling expenses, factory warehouse and shipping expense, outside transportation, interest, office supplies, dues, outside auditing, legal services, inventory differences, breakage, samples, freight, express, cartage, parcel post, obsolete finished goods losses, telegraph, telephone and miscellaneous	$131,415.89	(12.7%)		
TOTAL OVER-ALL COST			$969,580.20	(93.7%)
NET PROFIT ON OPERATIONS			$65,190.57	(6.3%)

Notice that "Heat, light, power and water" dropped 3/5 of 1 per cent in 1940 while sales averaged an increase of 16.3 per cent. This was due mainly to the replacement of under-sized motors, machines and electrical wiring equipment; also to the improvement of automatic controls. Under-sized motors or machines, inadequate wiring and electrical equipment keep power bills high. Controls that were adequate in 1939 and before may be inadequate today because, with production speeded up to unprecedented proportions, processing operations become more exacting and older controls cannot do the work economically or efficiently or meet the more rigid specifications demanded.

Manufacturers have anticipated this demand for better automatic controls and offer equipment that will suit every demand today. Fifteen plants out of the 19 analyzed installed advance control devices of maximum sensitivity to police every phase of operation and keep down power costs and material losses to minimum. The reduction of 2.6 per cent in material costs, in a period when material prices were advancing, is largely attributable to the large number of these plants revising their automatic controls to "adequatize" production.

Inter-plant haulage, if inadequate, is another drag on old and new equipment. Nine plants speeded up production by merely stepping up movement of goods from operation to operation with adequate materials handling equipment, replacing methods and equipment that were satisfactory when production ran more to normalcy but inadequate for present-day demands.

One plant installed a conveying system to pick up stock from one refiner and transfer it to another for further processing, increasing output 20 per cent. Another plant reported that a similar conveyor system installed in 1940 increased the quality of the finished product because it prevented the accumulations of hot rubber in process. Hot rubber tends to oxidize, adversely affecting the quality of the product. The inadequate materials handling methods used in 1939 did not keep the stock moving fast enough to prevent these accumulations.

One mill was getting an average productivity of 49.6 pounds per man-hour (compounding, milling and tubing) which brought the labor wage rate to 79.3 cents per man-hour or $1.60 per 100 pounds of processed stock. The sheeting mill, mixer and tuber used were efficient but under-sized for preparedness capacity. Adequate units were installed to meet present demands and production jumped to 205.3 pounds per man-hour, a gain of 314 per cent, or a drop to 38.6 cents per 100 pounds of processed stock, a reduction of 76 per cent in labor cost for these operations.

Some plants, when installing new machines, never consider re-wiring, the installation of more convenience outlets or higher intensity lighting equipment. Eight plants installed more adequate wiring and better lighting in 1940 with a decided upping of production efficiency. Output was increased 15 per cent in one department where the machines were adequate but the light inadequate. Your workers are only as good as their eyes. Prepare for maximum profits with adequate "see power".

During recent years, mill drives in many rubber factories have not kept pace with expansion. Mill drives unable to handle capacity loads were costly enough in

more placid times but now they are a veritable menace to profitable production because of the greater hazards resulting from high-speed demand. In our previous survey, and on this field study, we found plants using drives with little overhead capacity; hence, peak loads were causing frequent breakdowns. Unless drives are adequate, they cannot stand up under the heavier loads put on them today.

Menace to Production and Profits

From our field work, we can report that inadequacy of mill drives is a serious menace to production and profits in this industry. All plant managements should check over their drives and, when found wanting, "adequatize" them. Those managements contacted where drives had been made adequate advised a long overload capacity, say 100 per cent, to provide a wide margin of safety for the excessive loads coming through today.

Space does not allow us to give additional case histories covering increased output, labor savings and other economies resulting from the installation of adequate equipment in 1940, but among the replacements were mills of various kinds, controls, washers, insulators, vulcanizers, strainers, refiners, cutters, tubers, extruding machines, timers for automatic operation of molding presses and general purpose timers for vulcanizing processes, cement mixers for speedier dissolving of rubber over previous models,—all this equipment more easily operated and more appropriately designed to the production speeds demanded today.

Sales averaged an increase of 16.3 per cent, which promises much to these 19 users and others who install adequate equipment, because this increase materialized in 1940 and production will soar much higher and profits head in the same direction in 1941 and thereafter for all rubber factories adequately equipped. Net profits averaged an increase of $37,608.55. The investment in equipment adequacy, including the necessary alterations, wiring and accessories, averaged $36,408.10. So, if this research is used as a yardstick, we may conclude that adequacy pays for itself in less than a year.

It is not to be assumed that all users of adequate equipment will net the same profit or return on investment, because circumstances alter cases. Nevertheless, it is apparent that it pays to have your plant equipped to handle bumper production without extending itself. Then, too, remember that Statement B covered 1940 when defense monies were just beginning to circulate. With appropriations under fuller flow now, and widening with the months, the rubber goods manufacturer can liquidate his investment in adequacy or modernization as regards machinery and equipment in even faster time this year and next.

Some may say that the increased sales in 1940 were due to defense appropriations, that these plants could have gotten additional volume without installing adequate equipment. We will agree. But analysis of the records of these plants in 1939 showed that as production stepped up toward the end of that year, and the inadequate equipment was being taxed more to produce more, net profits began to drop monthly, despite the increased volume, until the average for the group was only 3.1 per cent on sales for 1939.

We can say from our study of these figures that had the 19 plants retained their inadequate equipment during 1940, they may have handled the same increased volume—16.3 per cent—but they would have made a net profit of even less than 3.1 per cent, because the law of diminishing returns would have controlled operations. Their records showed that profits during the early months of 1939 averaged 5.8 per cent but this average thinned down to 3.1 per cent at the end of the year because of excessive breakdowns, delays, under-sized machines, badly coordinated schedules, slow-speed machinery, etc.

Yes, you may sell capacity production this year and next, but you won't make maximum profits unless your machinery is adequate. This is indicated by the fact that factory overhead and commercial and administration expenses combined totaled 28 per cent in 1939, and also in 1940, although sales increased 16.3 per cent. Inadequate, under-sized equipment keeps the business burden in high.

Also notice that labor costs dropped 3/5 of 1 per cent on sales after the plants "adequatized". Labor is an item of expense that management engineers predicted would soar as the business boom spread. This survey indicates that the payroll can be kept within bounds if the machinery used by workers is adequate to take care of sustained peak production. A working ratio should be set and carefully maintained.

Certain authorities contend that price rises are inevitable, and already they are on the march in many lines. Although Washington has set machinery in motion to prevent the type of profiteering experienced during the last war, nevertheless the law of supply and demand is irrevocable. As selling prices on rubber goods go up, the margin of profit is not likely to increase for the user of old or inadequate equipment because his costs will go up proportionately in many cases. On the other hand, the user of modern, adequate equipment can keep his costs down more easily and hold on to some of the increased spread. Then, too, the upward trend in prices is sure to touch processing machinery, which makes it imperative for users of inadequate equipment to act now for two reasons—to save money on first cost of equipment and to get the additional profits resulting from adequacy without delay.

Changes Should Be Made Now

The greater speed of modern units was definitely established in previous field studies and verified again in this survey, the users reporting up to 30 per cent speedier operation. This means much more today than in normal times because labor will be scarcer due to the draft and to high wages paid on defense work. Industry is expected to take on between 2,500,000 and 3,750,000 more workers by July, 1941. Conscription and National Guard mobilization programs should take more than 1,000,000 additional men out of the labor market in this period.

Defense appropriations are priming the pump. The rubber goods manufacturer can keep a steady stream of sizable sales volume flowing his way and make a sizable profit on it if his equipment is adequate. If present facilities are inadequate, the necessary changes should be made now. We realize that taxes and labor will be high but production will be peak too, which will give the rubber goods manufacturer ample opportunity to make substantial profits if his equipment is able to turn out production at minimum cost, and that very definitely means machinery adequately fitted to today's demands.

Fire Safety Work In Rubber Factories

Safeguards Must Keep Pace with Expansion and Production

By LEONARD F. MAAR

Safety Research Institute
New York City

THE tremendous increase in the production of rubber products that has been thrust upon the industry by the needs of the defense program will be accompanied by a greater number of fires unless unusual precautions are taken. This is not a guess, nor a baseless prediction. It is predicated upon the experience of all industry. When the industrial index of the Federal Reserve is plotted against the number of fires and explosions, as in Chart I, it will be seen that the relationship is amazingly direct.

This close relationship is explained by the fact that most fires in manufacturing plants start as the result of actual operation. If production is carried beyond one shift, the opportunities for fire become correspondingly greater. Chart II shows how the frequency of fire increases during working hours in one-shift operation. Double the number of working hours and the number of fires will be proportionately increased.

To these almost mathematical reasons for expecting a greater incidence of fire must be added other considerations pertinent to current conditions. Unskilled and inexperienced men are being put to work in rubber plants. Facilities of all kinds are being taxed to capacity. In the haste of getting the job done some of the normal safeguards may be neglected. Plant expansion may be rushed beyond safe limits so that fire protection does not keep up with it.

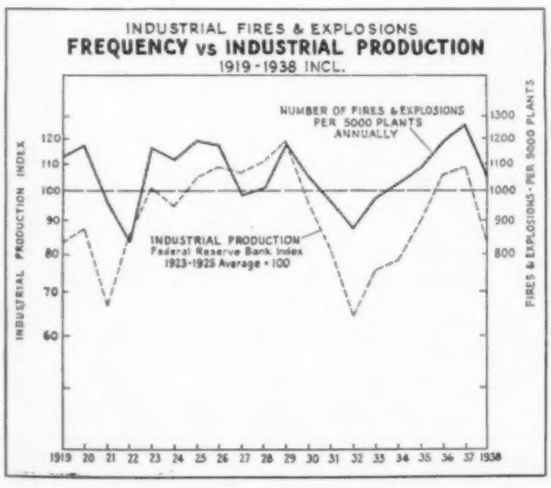

INDUSTRIAL FIRES & EXPLOSIONS
FREQUENCY vs INDUSTRIAL PRODUCTION
1919-1938 INCL.
NUMBER OF FIRES & EXPLOSIONS PER 5000 PLANTS ANNUALLY
INDUSTRIAL PRODUCTION
Federal Reserve Bank Index
1923-1925 Average = 100
INDUSTRIAL PRODUCTION INDEX
FIRES & EXPLOSIONS - PER 5000 PLANTS
1919 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 1938

CHART I

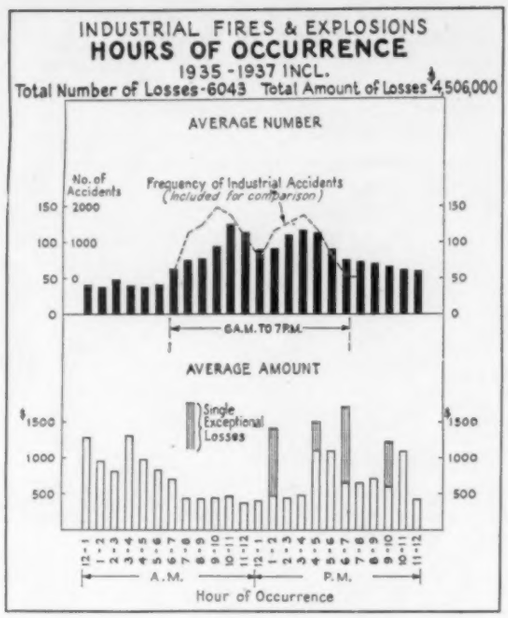


CHART II

There is still another approach to an understanding of the serious nature of the fire problem. Conditions today are not very different from what they were preliminary to our entry into World War I. In 1915, the National Board of Fire Underwriters reported a total loss of $172,033,200. Four years later, in 1919, the loss mounted to $320,540,399. And though conditions are nearly parallel, the present rate of spending is more rapid than it was twenty-five years ago.

A good motto for the present crisis is, "We Are Not Alone." It has been said that it requires the products of 357 manufacturers to make one Martin bomber. A fire in one of the many contributing plants might seriously impede production in the Martin plant.

During the recent Allis-Chalmers strike it was reported that thirty other factories were forced to shut down or curtail production because they could not obtain materials from the struck plant. Fire can accomplish the same end with perhaps more serious consequences. If patterns and tools were lost as the result of fire, the delay might extend for months, owing to the limited production capacity of the tool industry.

These facts are well recognized in the rubber industry, and because of them manufacturers are working with government agencies and the engineering departments of their fire insurance companies to reduce the hazards and improve the protection of the individual plants.

The biggest ray of hope is the fact that the rubber industry itself has learned how to control its fire hazards and to minimize losses when fire does occur. The problem is to apply this special knowledge.

Among plants insured by the Factory Mutual fire

insurance system—as an illustration—it has been noted that the majority of fires are being so well handled in their incipiency that they account for only a small proportion of the total annual loss. On the other hand, a very few fires, through lack of sufficient protection or because of the failure of the human element, get out of control and cause an unusually large loss.

Thus, during a three-year period, 68% of the fires and explosions caused less than 7% of the total loss, whereas 2½% of the fires and explosions were responsible for about 59% of the total loss. Fire safety during the defense program is aimed at bringing that 2½% of fire into the same column as the small loss fires.

There is no need to describe here in detail the techniques being followed to bring this objective into accomplishment. But briefly, the improvement program has two angles of approach: (1) the education and training of workers and (2) the provision of adequate fire protection equipment.

The safe practices of the industry are being taught to new workers and this involves giving foremen and their assistants some training in the teaching skills. Education in fire safety is reaching more and more men so they will understand the hazards of their jobs and learn how to prevent fire from happening and how to put out or control the unavoidable fires.

The Protection Program

It is obvious that perfection of fire control can not depend upon prevention alone. A certain number of unavoidable fires are bound to occur in rubber plants as well as in any other industry. Therefore, protection is vitally important. Some folks are inclined to think of protection only in terms of the equipment used to fight fire—fire extinguishers, standpipe hose, sprinklers, automatic equipment, etc. This is not the whole story.

In a large Philadelphia rubber factory it was the custom to store fabric and cord on the bare floor without skids under the material. On the floor above, hose fabric was being waxed in a dip tank to which naphtha thinner was added occasionally from a 5-gallon safety can. For some reason, perhaps an electric spark did it, the naphtha vapors were ignited and a flash fire resulted which opened ten or eleven sprinkler heads, most of which were beyond the small area where the waxing process was located. After the first burst of fire, employees attacked the flames at their source—the dip tank—using fire extinguishers and a line of hose. Fire damaged only the contents of the tank. But by the time the sprinkler valves were shut off, water had leaked down upon the floor below until it was several inches deep. A large quantity of fabric and cord was damaged. If the material had been on skids, the water damage would have been slight. So a simple plant procedure of this kind also can be classed as fire protection.

More and more emphasis is being placed on first aid protection. The National Fire Protection Association has estimated that from seventy to ninety per cent of all fires that start are put out with first aid fire appliances.

Herbert W. Lange, formerly an assistant engineer of the Underwriters' Laboratories, Inc., has estimated that sixty per cent of the fires which public fire departments are called upon to control are extinguished with hand appliances. He says also that fifty to ninety per cent of all industrial fires are put out with extinguishers. He quotes the experience of one of the country's major industries, which showed that in more than 3,000 fires in the course of a year all but two or three were extinguished with hand extinguishers.

The fires that did not require hose streams or sprinklers involved little or no interruption of business or losses attributed thereto. The fire and water damage naturally was held to a minimum and the consequential losses of life and property were practically eliminated.

CAUSES AND DAMAGE IN 193 RUBBER PLANT FIRES

Manufacturing Processes (except Driers and Ovens)

Causes	% of Number of Fires	% of Amount of Damage	Average Damage
Electrical	25.39	11.71	$198.20
Static Sparks	19.69	3.76	82.02
Friction	12.96	4.43	147.02
Spontaneous Ignition	5.70	2.93	221.18
Cutting and Welding	5.70	3.70	278.61
Hot Steam Pipes	1.03	2.02	838.78
Smoking	1.03	1.12	466.21
Molten Metal	.52	.14	112.23
Lightning	.52	.04	33.38
Overheating	.52	.03	21.60
Not Determined	1.03	.20	84.69
All Manufacturing Processes	74.09	30.08	$174.46
Driers and Ovens			
Spontaneous Ignition	5.70	4.28	$322.46
Overheating	4.14	2.46	254.80
Hot Pipes or Ducts	4.14	5.44	564.18
Gas Burners	.52	.37	308.33
Electrical—Motors	.52	.11	90.39
Static Sparks	.52	.03	26.29
Smoking	.52	.17	138.81
Cutting and Welding	.52	.68	561.62
All Driers and Ovens	16.58	13.54	$350.76
Storage			
Spontaneous Ignition	2.07	1.76	$364.88
Smoking	1.56	2.44	675.88
Exposure	1.56	17.76	4,908.66
Hot Steam Pipes	1.04	1.95	810.74
Electrical	1.03	.38	157.50
Spark from Locomotive	.52	30.77	25,513.92
Acetylene Torch	.52	1.18	975.84
Not Determined	1.03	.14	57.03
All Storage	9.33	56.38	$2,597.41
All Causes	100.00	100.00	$429.67

Fire Causes Determined

Much of the fire safety work in rubber factories depends upon recognition of fire causes. The Inspection Department of the Factory Mutual system recently completed a study of the causes of 193 fires that occurred in a three-year period, with the results shown in the accompanying table.

These are the danger spots which the industry must safeguard. By applying all possible preventive measures, and, by providing adequate protection, the possibility of an increase in the number of fires can be overcome despite the large demands of the defense program.

Census Data for 1939 on Miscellaneous Rubber Products

THE nation's 519 establishments in 1939 engaged primarily in the manufacture of rubber products other than footwear, tires and tubes produced goods valued at $264,525,200, according to a preliminary report of the 1939 Census of Manufactures issued recently by Director William Lane Austin of the Bureau of the Census. The 1939 production total is a gain of 12.7 per cent over the 1937 total, the year covered by the next preceding manufactures canvass, which reported a value of $234,774,018. Among the products covered in the report are rubber heels and soles; belts, hose and tubing; hard rubber goods, such as battery boxes, combs, cigarette holders, etc.; rubber tile; rubberized fabrics and clothing.

Manufacturers of tires and tubes and rubber footwear are covered in separate reports which have already been issued. (See RUBBER AGE, September and December, 1940). Products of the former had a value of $580,928,993, while the output of boot and shoe factories amounted to $49,980,591. A report has also been published on reclaimed rubber (see RUBBER AGE, December, 1940) which had a value of $6,894,018. All told, the various branches of the rubber manufacturing field had a total 1939 output in excess of 900 million dollars.

The gain in value was not uniform for all products of the industry. Rubber heels, for example, declined from 295,081,194 pairs in 1937, valued at $16,285,139, to 253,538,781 pairs in 1939, valued at $14,016,436. Production of rubber soles, on the other hand, more than doubled from 72,476,284 pairs in 1937 to 146,520,900 in 1939, with an increase in value from $10,750,044 to $15,113,561. This amounts to a drop in average factory value per pair from 14.8 cents to 10.3 cents. Production of soling strips and top-lift sheets totaled 8,338,017 square feet, valued at $1,727,815.

Rubberized fabric output was reported as follows: automobile and carriage, 6,925,676 square yards, valued at $1,710,225; raincoat, 12,216,969 square yards, valued at $2,126,449; hospital sheeting, 3,857,247 square yards, valued at $1,639,519; and all other types, $16,178,430. The raincoat sheeting total, unlike the other rubberized fabrics, is considerably below the 1937 level of 21,374,062 square yards, valued at $4,873,452, probably because of the development of new plastic materials for raincoat use.

Belts Show Both Gains and Losses

Production of conveyor and elevator belts gained from 15,759,803 pounds to 21,601,048 pounds, with value up from $6,901,352 to $7,791,747. Flat transmission belts, however, fell off from 21,793,187 pounds to 15,734,803 pounds, with a loss in value from $13,381,938 to $7,304,147. Motor vehicle V-belts totaled 10,959,745 pounds, valued at $5,281,057. Other V-belts, including V-flat and V-cog, totaled 9,358,068 pounds, valued at $7,431,716. All other belting had a value of $1,131,676. The last three items had a total value of $13,844,449, which compares with $11,776,615 in 1937, when they were not reported separately.

Garden hose output was off slightly, from 46,932,725 pounds valued at $7,058,709 to 45,533,630 pounds valued at $6,471,085. Airbrake, airline, and other pneumatic hose dropped from 13,486,496 pounds to 13,143,099 pounds, with value falling from $4,914,841 to $4,474,897. Fire hose production increased from 9,345,767 pounds to 12,628,955 pounds, with value up from $4,726,025 to $5,460,007. Oil and gasoline hose totaled 8,886,508 pounds in 1939, with a value of $4,433,704, and all other hose amounted to $17,329,130. The combined total of $21,762,834 for the latter two items compares with $19,218,945 in 1937.

Production of Rubber Tubing Drops

Production of rubber tubing—11,438,326 pounds—was about half the 1937 total of 22,961,182 pounds. Its decline in value was proportionately less, from $4,491,613 to $2,608,622. Rubber packing output tapered from 14,046,511 pounds valued at $3,550,830 to 13,483,266 pounds valued at $2,955,353.

Output of washers, gaskets, pump sleeves, and liner strips increased from 15,017,089 pounds valued at $5,035,917 to 18,689,308 pounds valued at $7,137,343. Jar ring production rose from 6,117,233 pounds valued at $1,954,964 to 9,758,831 pounds valued at $2,667,432.

Rubber and friction tape output was up to 25,809,269 pounds in 1939 from 21,112,965 pounds in 1937, but value tapered off from $4,538,355 to $4,338,993.

SUMMARY OF DATA ON RUBBER PRODUCTS NOT ELSEWHERE CLASSIFIED

	1939	1937	% of increase
No. of Establishments	519	411	26.3
Salaried Personnel	7,407	6,677	10.9
Salaries	$18,303,498	$14,992,048	22.1
Wage Earners (Average for Year)	50,667	46,914	8.0
Wages	$53,357,735	$52,345,742	1.9
Cost of Materials, Supplies, Fuel, Purchased Electric Energy, and Contract Work	$122,875,735	$115,755,036	6.2
Value of Products	$264,525,200	$234,774,018	12.7
Value Added by Manufacture	$141,649,465	$119,018,982	19.0

Note: Because they account for a negligible portion of the national output, plants with annual production valued at less than $5,000 have been excluded since 1919.

Molded articles for insulating motor vehicles against vibration and sound decreased from 60,420,110 pounds valued at $13,223,241 to 39,840,987 pounds valued at $10,385,021, in line with the decrease in production of motor vehicles between 1937 and 1939.

Rubber-covered printers' rolls had a value of $1,915,919, while other rolls totaled $2,968,083, the combined figure of $4,884,002 being slightly above the 1937 level of $4,854,772. Mechanical goods not elsewhere classified had a total value of $32,180,151, compared with $38,905,781.

Production of rubber flooring, in tile or sheet form, increased from 8,771,293 square feet valued at $2,664,597 to 9,993,345 square feet valued at $2,920,312. Rubber mats and matting increased in value from $10,624,592 to $11,209,814.

Gains were shown in value of hard rubber goods in these classifications: battery jars, boxes, and parts, from $7,042,480 to $11,682,830; combs, from $2,261,676 to $2,353,759; mouth-pieces for pipes, and cigar and cigarette holders, from $401,103 to $422,193. Other hard rubber goods, except druggists' sundries, declined in value from $7,006,142 to $5,959,332.

Output of rubber thread increased from 5,618,105 pounds valued at $3,475,477 to 9,704,379 pounds valued at $7,539,142. Gallonage of rubber cement went up from 15,447,489 to 19,605,464, with a proportionately smaller rise in value from $8,931,113 to $10,055,115.

Production of rubber and rubberized gloves and mittens increased, although more detailed breakdowns for 1939 make itemized comparisons impossible. Production of the household type in 1939 numbered 892,038 dozen pairs, valued at $1,181,067. Surgeons' gloves totaled 851,581 dozen pairs, valued at $1,099,605. Electricians' gloves came to 12,365 dozen pairs, with a value of $298,847. Work gloves numbered 228,833 dozen pairs, having a value of $603,054, while all other types totaled $332,814 in value.

The output of water bottles and fountain syringes increased from 640,554 dozen to 682,824 dozen, but declined in value from $3,372,875 to $3,031,179. Production of nipples and pacifiers fell off from 517,281 gross to 423,709 gross, but rose in value from $1,209,716 to $1,384,264. All other druggists' and medical sundries, including medical, dental, and surgical hard rubber, gained in value from $5,747,022 to $7,037,325.

Poundage of stationers' rubber bands went up from 4,274,434 to 5,059,604, with a rise in value from $1,749,292 to $1,802,363. Production of erasers, not including pencil plugs, mounted from 1,679,373 pounds valued at $902,231 to 2,031,996 pounds valued at $1,015,998.

Sponge-rubber products not elsewhere classified gained in value from $9,291,743 to $11,125,789. Camelback output showed an increase from 34,126,448 pounds valued at $7,229,895 to 54,223,474 pounds valued at $10,611,932. Tire sundries and repair materials tapered in value from $8,899,832 to $8,816,419. Production of bathing caps rose from 789,504 dozen valued at $1,230,106 to 958,269 dozen valued at $1,423,853.

The value of all other manufactures of rubber shaded from $53,344,580 to $52,927,903. These totals include $9,373,084 for rubber clothing in 1939, compared with $11,054,705 in 1937; $2,125,628 for toy balloons in 1939, against $2,488,299 in 1937; and $5,302,926 for play balls and other rubber toys, compared with $4,777,832 in 1937.

With the 12.7 per cent increase in the industry's production came a 26.3 rise in the number of establishments, from 411 to 519, and a 6.2 per cent growth in the cost of materials, supplies, fuel, purchased electric energy, and contract work, from $115,755,036 to $122,875,735.

The number of salaried personnel was 10.9 per cent higher, the 1939 total of 7,407 comparing with 6,677 in 1937. Salaries were up 22.1 per cent, from $14,992,048 to $18,303,498.

Wage earners engaged primarily in manufacturing operations in 1939 numbered 50,667, with pay totaling $53,357,735. Even without distribution and construction workers, who will be covered in the final report for 1939, these totals are larger than those for 1937, which included all types of wage earners. On the basis of the preliminary 1939 figures, there was an 8 per cent gain over the 1937 total of 46,914 wage earners, and a 1.9 per cent gain in wages from the previous figure.

Positex—A New Latex Material

AS IS well known, the rubber particles in latex are negatively charged and, since textile fibers are normally negative to an aqueous medium, the particles of rubber contained in normal latex will not deposit on a fiber introduced into it. Some time ago, however, Dr. C. M. Blow, during the course of a research sponsored jointly by the British Rubber Producers' Research Association and the Wool Industries Research Association (of England), developed methods for producing a latex with reversed charge. One such latex is now available as "Positex." It is being marketed in England by the Revertex Sales Co., Ltd., and Messrs. Veedip, each of which holds a license from the two associations which sponsored the original research.

Positex, which can be obtained both in a vulcanized and in an unvulcanized state, possesses several remarkable properties. It is already being used for the production of special felts for the shoe trade. One company has made use of it to produce a waterproof crepe bandage. Other firms are now collaborating with the B.R.P.R.A. in attempts to produce an improved fiber board, a substitute leather, special felts for the use of the clothing trade, and other products using the new type latex.

The application of Positex in the textile field especially is said to have great possibilities. By its use designs can be printed on fabrics which when subsequently brushed up yield novel effects of a beautiful character. It imparts to rugs and carpets enormously increased wearing properties. It gives to a lightly twisted yarn the strength normally associated with a tightly twisted yarn, thereby opening up possibilities in the production of luxury fabrics, with a very soft feel, without any sacrifice of strength. Dr. Blow's processes are covered by several British patents.

Reinforcing Properties of Mapico 297

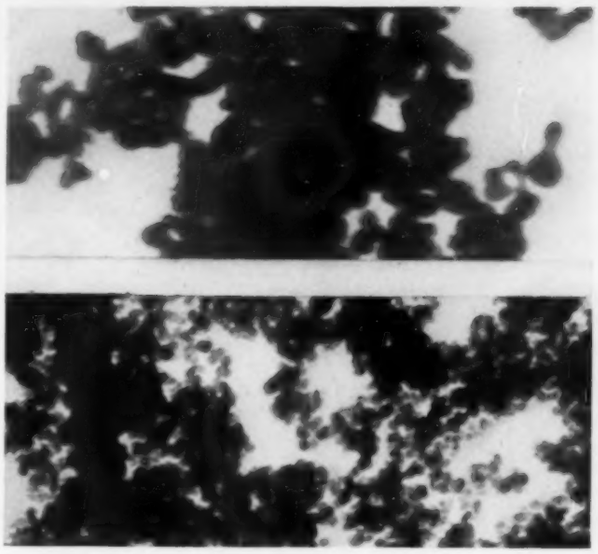
MAPICO 297 is the name of a relatively new red iron oxide pigment, produced from copperas by a continuous process by the Columbian Carbon Company and distributed by the Binney & Smith Company. It was especially developed to combine, so far as possible, the vivid flame-like hue of pure ferric oxide with the particulate structure and rubber compounding advantages of colloidal carbon.

The new material is said to be one of the most finely divided pigments available commercially. Examination with a light microscope at a magnification of 1250 reveals a field of aggregated and discrete particles, the latter being extremely fine and appearing to be spheroidal in shape. The electron microscope reveals that at a magnification of 36,300 the ultimate particles are definitely spheroidal in shape and approximately 60 mμ in diameter.

The average size of approximately 60 mμ for Mapico 297 is double the average size of Micronex, the colloidal carbon for rubber made by Columbian Carbon, as determined by a recent electron microscope study, but only approximately equal to the value of 50 mμ ascribed to this carbon pigment by earlier investigators. Furthermore, photomicrographs indicate that both the red oxide of iron and the colloidal carbon possess essentially the same spheroidal particle shape. (See accompanying photomicrographs).

The observation that Mapico 297 unmistakably belongs to the family of true colloids on the basis of particle size and possesses the same particle size as the reinforcing carbons, led to the conviction that it should give true reinforcing properties in rubber. This conclusion was confirmed by experimental results which revealed that the reinforcing effect of the new pigment in rubber is surpassed only by the family of impingement carbons. These results are discussed in "Red Oxide of Iron," a booklet recently issued by the Columbian Carbon Co.

The reinforcing properties of Mapico 297 as integrated by the "Delta A" function, classify the material as substantially equal to furnace carbon and



Top: Mapico 297 (36,300X). Bottom: Micronex (32,400X). Magnification by Electron Microscope.

markedly superior to zinc oxide as a reinforcing pigment. Its "range" of useful loading is equal to that of zinc oxide and its maximum reinforcement is greater than that of either zinc oxide or furnace carbon. Mapico 297, according to the booklet, is a toughening or reinforcing agent for rubber up to 30 volumes or 150 parts by weight on the rubber.

These valuable properties, it is said, are the natural consequence of the fine particle size (ranging well into the colloidal) and the spheroidal particle habit as revealed by the electron microscope, and coupled with high elongation even up to heavy loadings indicate that Mapico 297 is a valuable new ingredient for inside stocks in tires, for hose, belting and many specialized mechanical rubber uses.

Manufacture of Endless-Woven Belts

(Continued from Page 96)

run at speeds over 40,000 r.p.m., and keeping close check on service hours and failures, it is possible to get good testing data within a few hundred hours.

The measurement of surface wear is feasible in the laboratory. Probably the most valid method is the use of a modified V-belt tester originally developed by Norman of Ohio State University. This test utilizes two pulleys of different diameters keyed on the same shaft, driving down to two small pulleys, likewise of different diameters, and keyed on a freely revolving spindle. To an amount depending on the value of the difference in diameters, the belts tend to "buck" each other and wear occurs through enforced slippage. As the coefficient of friction of a pair of test belts determines the severity of the test (holding pulley diameters constant for all tests), it is necessary when testing these high friction belts to keep the pulley diameter differential to one-sixteenth of an inch.

It is very difficult to foresee the possible advances that will be made in high speed transmissions. The author's company has furnished during the past year, high-speed woven-endless rubber belts to operate at a spindle speed of 65,000 r.p.m. over a spindle diameter of one and one-eighth inch. The indications are that speeds of certain machine tools like grinders will be faster! The time allowed for an operation, whether it be grinding or cutting or drilling, is not only being steadily cut down through sheer speed increases but *work-done*, even when the time factor is held constant, has been increased by the use of better tools.

A high-speed belt operating this year at the same speed as last year and maintaining its service life at the same number of hours is actually doing between two and three times as much work. Under conditions such as these, industry itself has to serve as the testing laboratory.

Editorials . . . . . .

Shipping Situation

THAT the tight situation which has existed in the past few months in connection with the delivery of crude rubber from the Far East to the United States is near solution seems evident from events transpiring in the past few weeks. As predicted recently in these columns, the delivery of rubber has been tied into the defense program, and when the authorities behind that program go into action they generally succeed in achieving quick results. Therefore, unless Japan becomes a belligerent in the near future, deliveries of crude rubber to the United States should again assume the proportion attained before the tight situation developed due to lack of sufficient bottoms.

The first move made by the American Maritime Commission was a "deal" with the United States Army under which it was agreed that a certain number of Army transports would be used to bring rubber, tin and other strategic materials from the Far East to these shores. These transports normally would be employed in delivering supplies to Army bases. The Army, it was revealed, would collect standard shipping rates for the use of its transports and would use these funds to employ commercial ships to deliver its own supplies. The Commission, it is believed, will also requisition some commercial ships for the Pacific run.

It also seems evident from recent events, that the Pacific Coast will soon become the major crude rubber distributing center for American rubber manufacturers. Terminating rubber routes at Los Angeles and San Francisco will achieve two results: first, it shortens the sea route by approximately 34 days, thus securing the same result as by the use of additional vessels, and, secondly, it enables the release of a number of ships which can be employed to aid Britain's war effort against the Axis powers.

It is true that rail costs between the Pacific Coast and rubber manufacturing centers in this country will not equalize the freight saving by delivering to Los Angeles and San Francisco rather than direct to New York or Boston, but here again the problem is being attacked. The Far East Conference recently announced a reduction in the freight rate from the Far East from $26.50 to $22.50 per ton. This still does not equalize the cost between overland and sea routes, but it is understood that pressure is being brought to bear on rail interests in an effort to equalize the differential still further.

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Consumption Percentages

THE percentage position in consumption of crude rubber enjoyed by the tire and tube division of the industry continued to lose ground last year, according to the latest statistics released by the Rubber Manufacturers Association. In 1940, 76.11% of total crude rubber consumption went into the manufacture of tires and tubes as compared with 76.83% in 1939 and 77.05% in 1938. Increased production of sponge rubber and a greater use of crude in the manufacture of mechanical goods largely accounted for the gain made by non-tire products. Consumption of sponge rubber in 1940 was practically double that of 1939, 2.13% against 1.09%. Such consumption was only 0.84% of total rubber consumption in 1938.

CURRENT NEWS OF THE MONTH

SIMPLIFICATION COMMITTEE IS ACTIVE IN TIRE INDUSTRY

Dealers and other buyers are now receiving unwrapped truck tires, in sharply increasing quantities, as part of an important industry simplification and conservation program. The elimination of wrapping in no way affects the quality of the product and the resulting saving in kraft paper is useful. This step is just one phase of a cooperative tire industry effort designed to help the dealer through elimination of waste, through adoption of uniform practices, through reduction in the growing multiplicity of sizes and lines, and through progressive economy.

The national defense program has given a real impetus to industry efforts to simplify production and distribution all along the line. As the result of frequent meetings of the tire industry Simplification Committee, organized by members of the Tire Division of the Rubber Manufacturers Association, several manufacturers of truck tires, who represent a considerable proportion of total industry output, have eliminated wrapping all truck tires. Other companies have stopped wrapping the larger sizes and are extending the practice, and the remaining companies are now considering the question.

In Operation Several Years

The Simplification Committee has been in operation for several years, and comprises a representative cross-section of the tire manufacturing industry. This committee draws upon the sales and technical experts of the industry in tackling problems of direct interest to dealer, distributor, and consumer. The recommendations of the committee are referred for action to the Tire Division of the R.M.A.

Eliminating the wrapping of truck tires is only one of many healthy steps taken by the Simplification Committee to help the industry keep pace with the demands of the defense program for the minimizing of wasted effort. At present, the committe is actually engaged in cooperating with the Agricultural Tire Simplification Committee, composed of representatives of the leading farm equipment manufacturers and agricultural tire suppliers, in drastically reducing the number of unnecessary sizes and types now being utilized in the rapidly expanding new tire market. Other active programs involving the reduction of unpopular sizes, as a guide to future design, call for separate studies of all existing truck tire sizes, industrial tires and airplane tires.

The work of the Simplification Committee in eliminating approximately 40% of the individual items in all lines of passenger tires below the "100" level is well known, as is the drastic consolidation effected by the committee of truck solid and cushion tire lines, the reduction of unnecessary passenger mud and snow tire lines, the combination of high pressure and balloon truck and bus tubes, and many other "cut-the-waste" programs.

Ranking of the Rubber Industry

According to the Census Bureau, the tire and tube industry ranked 30th in 1939 in employment among leading industries, but in the cost of materials, value of products and value added by manufacture the position was much higher—17th in each instance. The rubber industry, other than tire and tube and footwear branches, ranked 33rd in employment, 38th in value added by manufacture, 51st in value of products, and 54th in cost of materials. The rubber boot and shoe industry ranked 133rd in employment, with lower listing in all other items.

ANOTHER NEOPRENE PLANT IS ANNOUNCED BY DuPONT

Confirming recent trade rumors, E. I. du Pont de Nemours & Co., Inc., has announced the selection of Louisville, Kentucky, as the site for its second neoprene plant. The new plant, which will be built, financed and operated by DuPont and which will have a capacity of 10,000 long tons a year, which exceeds the present combined total production of all synthetic rubbers, will be ready for operation in about six months, according to trade estimates.

The willingness of the DuPont management to make the very substantial appropriation required for the new project is said to have been predicated largely on the surprisingly good service that neoprene tires have shown in tests under a wide variety of service conditions. The company also looks forward to a marked increase in the use of neoprene in products where its resistance to sunlight deterioration is important.

MEASURES BEING FOSTERED TO RELIEVE SHIPPING PLIGHT

Every possible effort is being made by shippers in the Far East and the recently-organized Division of Emergency Shipping of the American Maritime Commission to relieve the tight shipping situation which currently exists on such cargoes as rubber and tin. Army freight transports are now being employed in limited number while arrangements have been made to discharge rubber, tin and other cargoes at Pacific Coast ports.

It was recently revealed by Robert P. Patterson, Under-Secretary of War, that eighteen Army transports and eight combination passenger and cargo transports were to be withdrawn from intercoastal service to supply America's Atlantic and Pacific bases. No authoritative estimate was available on the total number of Army freighters eventually to be assigned to the Pacific trade route, but it was indicated that there is relatively little need for such transports in the Atlantic.

Will Collect Standard Rates

According to present plans, the Army will collect standard shipping rates and will be able to expend a sum equivalent to these receipts in buying commercial cargo space on freighters to transport its own needed supplies to bases in the Pacific. The Navy, it was explained, cannot undertake the same procedure since its own requirements keep most of its transports busy constantly.

Because the space situation is considered acute, a plan for eliminating the intercoastal leg of the run from the Far East has received serious attention in recent months. This would involve throwing the burden of deliveries to the East Coast of the United States on transcontinental rail carriers, but it would cut approximately 34 days off present voyages and enable freighters to shuttle back and forth between the Pacific Coast and the Far East. Such routing would be more expensive, the savings in shipment and insurance rates on vessels en route to New York being more than offset by the higher rail charges between America's East and West coast.

The reduction in the ocean ship rate on rubber by $4.00 per ton, from $26.50 to $22.50, on shipments from the Far East to Pacific Coast ports will prove of some help. The reduction was authorized by members of the Far East Conference. No change was made in the rate to points on the Eastern U. S. seaboard, which remains at $27.00 a ton.

Rubber Division, A. C. S., Holds Successful Meeting at St. Louis; Program Includes Symposium, Papers, Many Reports, and Banquet

THE RUBBER DIVISION, A.C.S., held a successful and satisfying two-day meeting in St. Louis, Mo., on Thursday and Friday, April 10 and 11, in conjunction with the 101st meeting of the parent society. The Division's meeting included a Symposium on New Developments in the Processing of Rubber, the presentation of ten technical papers, reports from various committees, and the usual banquet. Headquarters for the Division were maintained at the Hotel Mayfair, but due to the large registration the technical sessions and banquet were held at the Hotel Statler. Over 400 members and guests attended the banquet, while more than 320 were in attendance at the technical sessions.

Abstracts of the four papers given at the Symposium as well as the ten technical papers appeared in the March, 1941, issue of RUBBER AGE. The highlight of the Symposium, however, was the presentation of two one-hour motion pictures, titled "Robots and Rubber" and "Rubber at the Rouge," respectively. Both films were prepared by the Farrel-Birmingham Company, under the direction of Andrew Hale, with photography by E. J. von der Heide.

"Robots and Rubber" traced the developments which have taken place in rubber-working machinery made by Farrel-Birmingham in the past two or three decades. Labor-saving features were particularly stressed with emphasis given to the fact that such machinery actually spreads employment. An appendix to this film showed the "mill room of tomorrow." Through a series of clever drawings, it was shown how it may some day be possible for one operator to produce rubber products from bale to finished article by means of special apparatus built around a giant Banbury. Close-ups of each step were portrayed. The second film, "Rubber at the Rouge," traces the manufacture of tires at the Ford tire plant at River Rouge, Mich.

Spence Named Goodyear Lecturer

E. B. Curtis (Vanderbilt), chairman of the Goodyear Lecture Committee, announced that Dr. David Spence had been selected as the first Goodyear Lecturer. Dr. Spence will deliver his lecture, on a subject to be announced later, at the Fall meeting of the Division to be held in Atlantic City. Mr. Curtis, also head of the Nominating Committee, submitted the following slate of proposed officers of the Division for next year, with final selections to be made by letter ballot:

Chairman, J. N. Street (Firestone); *Vice-Chairman,* John T. Blake (Simplex Wire) and F. H. Amon (Cabot); *Secretary,* H. I. Cramer (Akron University); *Treasurer,* C. W. Christensen (Monsanto); *Sergeant-at-Arms,* C. P. Hall and Ralph Appleby; *Members of Executive Committee,* George Haslam (N. J. Zinc), C. R. Park (Firestone), Harvey Doering (Ford), W. F. Tuley (Naugatuck), P. K. Frolich (Standard Oil), and Norman Bekkedahl (Bureau of Standards).

Charles R. Haynes (Binney & Smith), chairman of the Membership Committee, reported a 5% increase in the membership since last September, a total of 34 new members having joined the Division since that time.

Crude Rubber Committee's Report

The Crude Rubber Committee presented two testing procedures for adoption by the Division. The first was a procedure for testing plasticity and the second for testing water absorption.

The plasticity test is distinguished from others previously proposed in that it includes the determination of plasticity at three different degrees of milling. This method is believed to more accurately reflect the behavior of the rubber on milling than does the determination of a single degree of plasticity.

A 300 gram sample is placed on a standard 12-inch laboratory mill, with the flow of cooling water adjusted to maintain a temperature of 115 to 120° F. The opening between the rolls is exactly .04" as determined by using lead slugs. The sample is passed through the mill ten times; five times adjacent to one guide and five times adjacent to the other. Each time it is rolled and inserted endwise in the mill, thus blending the sample. The sample is then allowed to run continuously for three minutes without cutting.

It was found that cutting seriously affected the results as no two operators cut stock exactly alike. After the period of continuous milling, the rubber is cut across the mill and rolled and inserted lengthwise into the mill and rolled up after passing through the mill. This is repeated twice and finally the sheet is folded to the proper thickness for testing and chilled in tap water at 60° to 70° F. for five minutes. Testing must be carried out within 24 hours of milling.

The milling operation described above is repeated twice with 300 gram portions of the original sample, duplicating each operation exactly with the exception of the length of time the rubber runs on the roll without cutting. The second portion is allowed to run six minutes and the third portion nine minutes.

The actual tests may be carried out on either the Williams plastometer or the Mooney shearing disc plastometer. The Williams plasticity test should be made at 158° F. with a preheating period of 15 minutes at 158° F. and using a 5 kilogram weight. The Mooney test is for one minute at 100° C.

The water absorption test is basically a determination of the amount of water absorbed by a piece of crude rubber of specified dimensions when soaked in distilled water under standard conditions. An 800 gram sample is milled for 10 minutes on a standard laboratory mill, at a roll temperature of 155-160° F. The opening between the rolls is set at .075" using lead slugs. The sample is cut continuously. After milling, the rubber is placed in Holland cloth and cooled for 24 hours. A 2" by 5" sample is died out and the Holland cloth carefully removed.

The sample is weighed to the nearest 1/10th milligram and folded in a piece of ten-mesh aluminum wire. It is immersed in distilled water for 20 hours at a temperature of 158° F., removed and blotted lightly to remove excess water. It is dried in a stream of air at room temperature and weighed to 1/10th milligram. The increase in weight is the water absorbed and can be expressed in per cent or in milligrams per square centimeter.

Banquet Termed Huge Success

The banquet, which was held on Thursday evening, April 10, at the Hotel Statler, was termed by all as a thoroughly enjoyable affair. An excellent dinner was served, followed by several variety acts, after which a group of hostesses appeared on the scene for dancing. Heading the banquet committee was F. W. Frerichs (Cupples Co.), who is to be congratulated on a job well done. Ably assisting Mr. Frerichs were F. W. Knoke (American Zinc Sales), G. K. Trimble (Midwest Rubber Reclaiming), R. L. Randall (Midwest Rubber Reclaiming), A. H. Smith (Monsanto), and L. K. Ayers (Geo. S. Mepham Corp.). W. "Bill" Welch, president of Midwest Rubber Reclaiming Co., acted as toastmaster at the banquet. The entertainment provided was made possible by generous donations received from the following companies:

American Cyanamid, American Zinc Sales, Binney & Smith, Godfrey L. Cabot, Columbia Chemical, Continental Carbon, Cupples, Dispersions Process, DuPont, Farrel-Birmingham, General Atlas Carbon, C. P. Hall, Herron & Meyer, J. M. Huber, George S. Mepham, Midwest Rubber Reclaiming, Monsanto, Moore & Munger, H. Muehlstein, Naugatuck Chemical, New Jersey Zinc, Pequanoc Rubber, Philadelphia Rubber Works, A. Schulman, Henry L. Scott, St. Joseph Lead, Titanium Pigment, United Carbon, U. S. Rubber Reclaiming, R. T. Vanderbilt, C. K. Williams, Wishnick-Tumpeer, Xylos Rubber.

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MICRONEX MEANS MORE MILEAGE

CRUDE RUBBER DEVELOPMENTS OCCUPY ATTENTION OF TRADE

The attention of the entire rubber industry, both domestic and foreign, was focused on international developments concerning crude rubber during the past month. With world conditions in so unsettled a state, it is natural that every announcement, every agreement, every rumor receive close attention. Among events transpiring during the past thirty days were the following:

A rubber sales bureau, called Comptoir de Vent du Caoutchouc, was established by the government in French Indo-China with a view to centralizing the storage and sales of all rubber produced in that country. Local planters will be required to turn over their entire production to the new bureau. Although Japan and French Indo-China signed an economic agreement on May 6 the agreement made no specific reference to rubber. Previously it was understood that Japan would take Indo-China's complete rubber production.

Japanese investments in rubber plantations in Sumatra, it was revealed, are increasing rapidly. Of the 8,200,000 acres of rubber under cultivation in Sumatra, it was said, approximately 120,000 acres are under Japanese management. The figures were issued by Saburo Matsumoto, managing director of the Showa Rubber Co., on his return to Tokio after a one-year inspection trip in rubber-growing countries in the East.

A large consignment of budwood of superior rubber trees, developed in Malaya and the Dutch East Indies, arrived in Haiti last month, after shipment from the Philippines where the stock has been propagated since 1934. A dual economic agreement, providing for expansion of numerous crops in Haiti, including rubber, was reached between that country and the United States on May 5. An experimental station and breeding gardens for rubber seedlings have already been established in Haiti by the U. S. Department of Agriculture.

A brief dispatch from Bucharest on April 17 stated that the sale of rubber of any kind in Rumania had been blocked by government decree. No reason for the decree was mentioned but it is believed that Rumania has had increasing difficulties in securing crude rubber.

GENERAL TIRE EXPANDING SOUTH AMERICAN INTERESTS

Announcement has been made that General Tire & Rubber Company will participate in the construction and operation of a tire factory in Chile with a production capacity of 100,000 casings and tubes a year. The new factory will be located at Maipu, a small town located about 10 kilometers west of Santiago. This is the second tire plant in South America in which General Tire has a direct interest. The other plant is in Venezuela and is scheduled to go into production shortly.

The Chilean factory will be operated by a new company to be known as the Industria Nacional de Neumaticos, S.A., formed with American and Chilean capital. It will have a total initial capitalization of $4,000,000. General Tire technicians will be in charge of the plant's operations, which will include the manufacture of sundry rubber products, and all articles will be marketed in Chile.

At the same time it was revealed that General Tire executives are studying the advisability of founding a similar company in Portugal to build and operate a plant in that country under supervision of the Akron concern. Prior to the outbreak of European hostilities, General Tire operated a plant in Poland under similar organizations to those in South America.

Coming Events

June 1-6. S.A.E., Summer Meeting, White Sulphur Springs, W. Va.

June 6. New York Rubber Group, Outing, North Jersey Country Club, Preakness (near Paterson), N. J.

June 6. Chicago Rubber Group, Plastics Symposium, Congress Hotel, Chicago, Ill.

June 14. Buffalo Group, outing.

June 16-20. Semi-annual Meeting, A.S.M.E., Kansas City, Mo.

June 20. Akron Rubber Group, Annual Outing, Silver Lake Country Club, Akron, Ohio.

June 23-27. A.S.T.M. Annual Meeting, Palmer House, Chicago, Ill.

Sept. 10-11. Rubber Division, A.C.S., Ritz-Carlton Hotel, Atlantic City, N. J.

Plymouth Rubber Suffers Fire

The worst fire ever experienced in Canton, Mass., destroyed one of the main buildings, as well as several smaller buildings, of the Plymouth Rubber Company on April 2. Damage was estimated at more than $500,000. The fire is believed to have started on the top floor of a building housing the calender, spreading and curing rooms. It spread so rapidly that a general alarm was issued and it took over four hours to bring the flames under control. Some 1,000 workers were affected by the damage, although the company planned on putting most of them back to work shortly. As a result of the fire, Plymouth Rubber negotiated for and purchased the factory and business of the Rockland Rubber Co., at Rockland, Mass., a company recently organized by Harry D. Robinson, who was formerly connected with Plymouth Rubber.

BRITISH MINISTRY OF SUPPLY MAKES AGREEMENT WITH TRADE

An agreement which will have far reaching effects was concluded between the London Rubber Trade Association and the British Ministry of Supply on May 6 whereby the London rubber market, which faced early closure, will remain open for trading within the following prescribed limits:

(1) The Ministry of Supply, through the rubber controller, becomes the sole United Kingdom importer; (2) The Ministry is prepared to utilize the market for the purchase of rubber and service to the consumer. (3) There will be no new sales involving shipments from abroad to the United Kingdom, excepting fulfillment of existing contracts; (4) Outsiders' open commitments will be liquidated as or before coming due; (5) The controller's purchases for shipment to the United Kingdom will be effected through the market on f.o.b. terms.

The motives behind the new measures, which were received with mixed feelings by the trade, are presumably, first, to centralize precious freight space; secondly, to eliminate London's premium over Eastern and New York priority; thirdly, to coordinate with the Regulation Committee and especially with United States buyers; finally, to centralize the disposition of strategic United Kingdom stocks before they deteriorate to the point where they would be unusable. It is believed that the desire to assist the United States in acquiring its reserve stockpile of rubber through the medium of the purchase of such rubber by the Rubber Reserve Company notably influenced the decision of the British Ministry.

In clarifying the agreement, it was stated that the controller will make sales to dealers and manufacturers and that further details concerning such sales would be released shortly. Holders of existing United Kingdom stocks, it was said, can sell provided sales are made to consumers, approved firms, or members of the London Rubber Trade Association. Any reasonable request for special consideration will receive full attention from the controller. It is evident from the terms of the agreement that firms whose business is largely of a speculative nature will suffer most under the new measure.

Changes at Okonite Company

Several changes in personnel were voted at the annual stockholders meeting of the Okonite Co., held in Passaic, N. J., on April 15. Charles E. Brown, Jr., formerly assistant to the president, was elected a vice-president. Albert F. Metz, treasurer, was elected a director of the Okonite-Callender Cable Co., a subsidiary. Leland B. Duer, who has participated in the work of the company's legal department for many years, was elected a director to replace the late George Murray Brooks.

BUFFALO AND ONTARIO GROUPS HOLD FIRST JOINT MEETING

Ever since the formation of the Buffalo Group, Rubber Division, A.C.S., it was the hope of the executives of that group and those of the Ontario Rubber Section of the Canadian Chemical Association that a joint meeting of both organizations could be held. That hope was realized on Thursday, May 1, when the first joint meeting of the groups was held at the Hotel General Brock on the Canadian side of Niagara Falls. Approximately 240 members and guests attended the meeting, including many visitors from the New York and Akron areas. This first joint meeting was definitely a success and should lead to subsequent ones.

The meeting featured an address by Dr. Arthur Neal, head of the rubber department of the Jackson Laboratory of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, on "The Plasticization of Rubber,' and two lengthy movie films, entitled, respectively, "Robots and Rubber" and "Rubber at the Rouge," shown through the courtesy of the Farrel-Birmingham Company. An excellent dinner was served before the meeting started, and a buffet supper was provided by the Organic Chemicals Division of Canadian Industries, Ltd. The R. T. Vanderbilt Company acted as hosts before dinner.

Dr. Norman S. Grace, chairman of the Ontario Group, opened the meeting with a welcoming address to all those present and then introduced the executive members of the Buffalo Group. The courtesy was returned by John S. Plumb, chairman of the Buffalo Group, who introduced the executive members of the Ontario Group. Dr. Grace then called upon several members and guests to stand up and take a bow including, in order, S. C. Stillwagon (*India Rubber World*), M. E. Lerner (RUBBER AGE), A. A. Somerville (Vanderbilt), G. L. Roberts (United Carbon), Bruce Silver (N. J. Zinc), John Gammeter, Walter Juve, A. I. Brandt (Philadelphia Rubber Works), J. W. Crosby (Thiokol), W. F. Tuley (Naugatuck Chemical), R. A. North (Farrel-Birmingham), Warren Jones (General Cable), C. A. Bartle (DuPont) and several others.

Abstract of Neal's Paper

The speaker for the evening, Dr. Arthur Neal, was introduced by Dr. Grace, who first gave some interesting biographical information concerning the speaker's background. Dr. Neal discussed briefly the importance of the phenomena of plasticization to the rubber industry and gave an outline of the method of measurement and the commonly used physical methods of developing plasticity in rubber. The major portion of his address was concerned with the use of the chemical softening agents, particularly the rubber peptizing agents developed by DuPont and sold under the trade-name of R.P.A.

In connection with the chemical softening agents, Dr. Neal reviewed the fundamental knowledge which had to be developed before a successful search for these agents could be undertaken. He indicated the difficulties by referring to the fact that there were some fifty patents on the subject of plasticization. In discussing the chemical softening agents finally evolved in the research laboratory he covered their method of utilization, the advantages to be gained through their use in commercial practice, and the properties of the vulcanizates produced from rubber which has been chemically softened.

Dr. Neal mentioned the fact that when any of the R.P.A.'s were used hot milling was necessary. He discussed the specific advantages of the two chemical softening agents made by DuPont which are now commercially available and revealed that a third type, R.P.A. No. 4, composed of naphthyl alpha mercaptan and an inert hydrocarbon, will be available shortly. The new peptizing agent is understood to be more economical from the user's point of view, only one part being required to two and one-half parts of the other agents available.

The speaker discussed the results of tests on a typical footwear stock subjected to milling and two remillings. He also stated that experimental batches of 22 pounds incorporating R.P.A. No. 2 mixed on a hot mill reached a plasticity of 110 on the Williams Plastometer in 28 minutes as compared with 34 minutes for the same stock without a chemical softening agent. At the conclusion of his talk, Dr. Neal answered several questions from the floor.

Interesting Motion Pictures Shown

Showing of the two motion pictures was preceded by a few introductory remarks by Andrew Hale, branch manager of the Akron office of the Farrel-Birmingham Co., under whose direction both films were made. E. J. von der Heide, sales engineer of the company, did the photography. Mr. Hale pointed out in his remarks that labor-saving machinery actually created jobs for industrial workers, citing the rubber industry as an excellent example.

The films dealt with the improvements made in rubber working machinery in the past few decades and the method of manufacturing tires used in the Ford tire plant. They were the same films first shown at the meeting of the Rubber Division in St. Louis last month. (EDITOR'S NOTE: A more complete description of these films appears in the report of the meeting of the Rubber Division elsewhere in this issue).

The Sports Department of the Dunlop Tire & Rubber Corp., 500 Fifth Ave., New York City, has published the "Sell Him" booklet, said to be the first retail sales manual for the golf and tennis trade. The right and wrong ways to sell sporting goods are cleverly portrayed in the booklet.

LOS ANGELES GROUP HEARS TECHNICAL TALK ON KOROSEAL

A technical talk on the properties, advantages and uses of Koroseal, delivered by Harold Brand, of the B. F. Goodrich Co., featured the regular monthly supper meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel in Los Angeles on May 6. The speaker also exhibited a large number of articles finished from this material. Approximately 100 members and guests attended the meeting.

A sound picture in color, "Hawaii, U.S.A.," was also shown. The film was most complete and in addition to depicting the scenic beauty for which the island is noted it gave some indication of the defense preparations now under way. Pictures in color taken by Ed Royal and T. Kirk Hill on a recent tour of Mexico were also shown, with some explanatory remarks by Mr. Hill.

The door prize, an electric razor, was won by Bill Shawger, (Rubbercraft), while the special prize went to C. M. Reinke of Reinke, Hiller & Amende, Inc. These were donated by Lee Horchitz, of Goodrich, and E. F. Strakosch, of the Marshall-Dill Co., respectively.

At the business session, the treasurer, L. F. McDonald, revealed that the group had a balance of $161.65. Machinery to promote and handle details of the annual summer fishing trip was set up and an effort was begun to organize a golf tournament to decide the permanent ownership of the golf trophy which has been in the hands of the group for some time.

SYNTHETIC RUBBER TALKS FEATURE CHICAGO MEETING

Two talks on synthetic rubber, one by W. L. Semon, director of research of the Hydrocarbon Chemical & Rubber Co., and the other by O. M. Hayden, of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., featured the meeting of the Chicago Group, Rubber Division, A.C.S., held at the Congress Hotel in Chicago on May 2.

Dr. Semon discussed the "Development and Properties of Hycar Synthetic Rubber," while Mr. Hayden's topic was "Future Developments in Neoprene." Both speakers predicted wider applications of synthetic rubber in the early future. Following the speakers, Walter Grote, of the United Carbon Co., entertained with his "Rubber Magic." Approximately 250 members and guests attended the meeting.

As previously announced, eighteen rubber manufacturers in the Chicago area displayed products of their manufacture in a room set aside for this purpose. The products displayed ranged from industrial mountings to tires and tubes and received considerable attention from those attending the meeting. Similar exhibits are planned for future meetings of the Group.

New Head for Intercontinental

At a meeting of the board of directors of the Intercontinental Rubber Co., held in New York City on May 5, C. L. Baker was elected president and a director of that company as well as of its three subsidiaries, Continental-Mexican Rubber Co., Continental Rubber Co. of New York, and Rubber Surfacers, Inc. Mr. Baker has already assumed his new duties and is actively in charge of the company's affairs.

Although the new president has not been engaged in the rubber industry for a number of years, he was until recently in charge of all of the smelting properties of the American Smelting & Refining Co. in Mexico and so is fully familiar with operations and affairs in that country, with a wide acquaintance among Mexican business men and officials. The smelting operations over which he had supervision are in general similar in type to the rubber extraction operations conducted by the Continental-Mexican Rubber Co. Mr. Baker, of course, succeeds the late George H. Carnahan, who died on March 20, 1941.

H. G. Atwater, who has been associated with the activities of Intercontinental Rubber for many years, continues as vice-president of the parent concern and of its subsidiaries.

New Standards Made Available

As part of its planned program to better protect workers from the hazards of toxic dusts and gases in many industries, including the rubber industry, the American Standards Association, 29 West 39th St., New York City, has made available three new standards covering hydrogen sulfide, carbon disulfide and benzene. Recommendations are included to the effect that concentrations of carbon disulfide be kept below 20 parts per 1,000,000 parts of air for general factory and workroom purposes while the maximum allowable concentration of benzene (benzol) should be 100 parts per 1,000,000 parts of air for exposures not exceeding a total of eight hours daily.

Introduce Advagum Plastic

Advance Solvents & Chemical Corporation, 245 Fifth Ave., New York City, has introduced a new synthetic plastic under the trade-name of Advagum. The new material is described as an extender and modifier and is recommended by the company for use with all types of synthetic rubbers to accomplish better tear resistance, easier processing, improved aging, lower oil absorption, and lower volume costs. Literature and samples are available on request to the company.

Plan Next Rubber Division Meeting

The next meeting of the Rubber Division, A. C. S., will be held on Thursday and Friday, September 10 and 11, at Atlantic City, N. J., in conjunction with the 102nd meeting of the parent society. The Ritz-Carlton Hotel has been selected as headquarters for the Division, but the banquet, which will be held on Thursday evening, September 10, will be held at the Ambassador Hotel. Technical sessions will be held in the Atlantic City Auditorium. The Auditorium and both hotels are on the Boardwalk, within easy access to each other. Peter P. Pinto, general manager, RUBBER AGE, has been named Chairman of the Banquet and Entertainment Committee. Assisting him will be S. G. Byam (DuPont), W. F. Lamela (Okonite), Geo. J. Wyrough (Whitehead Bros.), Bryant Ross (Vanderbilt), and Arthur Nellen (Lee Tire).

Heliogen Blue BKA Powder

Heliogen Blue BKA Powder, an organic pigment for the coloring of rubber, has been introduced by the General Dyestuff Corp., New York City. The new pigment is said to possess great tinctorial strength and to produce brilliant blues of a natural cast in medium and light shades. It will not bleed or migrate, and is said to be fast to light.

A few familiar faces seen at the joint meeting of the Buffalo and Ontario Rubber Groups, held in Niagara Falls, Canada, on May 1. TOP ROW, left to right: Dave Scott and Bruce Silver; Arthur Neal; Michael Berman and Andrew Hale. BOTTOM ROW, left to right: Norman S. Grace; Burt Wetherbee; John S. Plumb. All photographs by Allyn K. Thayer. (See story on opposite page).

NAMES IN THE NEWS

ROBERT E. LEE, who has been superintendent of Plant 2 of the Goodyear Tire & Rubber Co. in Akron, has been named superintendent of the company's factory at Jackson, Mich. E. D. SHEAHAN, who has been superintendent at Jackson for the past four years, succeeds MR. LEE in Akron.

SEYMOUR MELTZER has been elected a vice-president of the Chicago Rubber Clothing Co., Racine, Wisconsin, succeeding ERNEST BUECHER, retired. MR. MELTZER has been acting as general manager of one of the company's sales agencies.

C. E. GUNN, of Robbins, Gunn & Co., brokers, and J. W. KELLEY, of the J. W. Kelley Co., oil concern, have been elected directors of the Aetna Rubber Co., Cleveland.

DONALD H. SPICER, long associated with the brake lining field, has been named general manager of the World Bestos Corp., Paterson, N. J., manufacturers of brake lining.

JOHN M. BAEL, associated with the R. T. Vanderbilt Co., and editor of *Vanderbilt News*, completes 20 years of service with that company this month. In July he will have completed 25 years of association with the rubber industry, having started with Manhattan Rubber in 1916.

LEONARD K. FIRESTONE, trade sales manager, Firestone Tire & Rubber Co., Akron, discusses "Executives for Tomorrow" in the March, 1941, issue of the *Executives Service Bulletin*, house organ of the Metropolitan Life Insurance Co.

DR. G. L. CUNNINGHAM has been appointed manager of the Technical Service Department, Columbia Chemical Division, Pittsburgh Plate Glass Co. He joined the parent company in September, 1940, after having served as a research chemist for the Mathieson Alkali Works since 1930.

BENJAMIN BALDWIN, engaged in production work for the General Tire & Rubber Co. for the past thirteen years, is now working on special production assignments for the Seiberling Rubber Co. under the direction of ART LEEDY, factory superintendent.

HENRY GILLEN, consulting superintendent of the Goodyear Tire & Rubber Co., Akron, completed 40 years of service with that company last month. He started with the company as a clerk in the shipping room.

DR. THOMAS MIDGLEY, JR., vice-president of the Ethyl Gasoline Corp. and chairman of the board of directors of the American Chemical Society, has been awarded the Priestley Medal, the Society's highest honor. The award was for both scientific ability and courage.

WILLIS J. KRAMER, prominently identified with the sale of chemicals for many years, has been appointed general manager of the chemical department of Philipp Brothers, Inc., New York City, chemical manufacturers, importers and agents. He succeeds GEORGE F. SMITH, who resigned to enter business on his own account as a manufacturers' agent.

LLOYD R. LEAVER, associated with the Jos. Stokes Rubber Co., Trenton, N. J., for many years, has been appointed vice-president and manager of the company's Canadian plant at Welland, Ontario. W. A. PATTERSON, formerly with the Pharis Tire & Rubber Co., has joined the company in a sales capacity.

ROBERT T. BOWMAN, formerly president of the New Jersey State Chamber of Commerce, has been named director of public relations for the John A. Roebling's Sons Co., Trenton, N. J.

JAMES H. CONNORS, vice-president in charge of mechanical goods of the B. F. Goodrich Co., suffered a mangled hand in a serious automobile accident in Akron on May 4. He was dragged from the flaming wreckage of his car by passing motorists. He is reported to be in "good condition."

RAY W. BROWN, manager, aeronautical department, General Tire & Rubber Co., has resigned that position to assume new duties with the Naval Air Force in connection with the air defense program. His son, JACK, has joined the mechanized infantry division of the Army.

HARRY W. BROWN has been appointed manager of the Cycle Tire Department of the U. S. Rubber Co. He recently held the position of assistant manager and previously was sales manager of bicycle tires for the Fisk Tire Co., which U. S. Rubber acquired in January, 1940.

FRED H. BARTH, a member of the sales department of the Mercer Rubber Co., Hamilton Square, N. J., for several years, has been named a vice-president of that company.

W. I. O'BRYAN, secretary-treasurer of the Pharis Tire & Rubber Co., Newark, Ohio, was injured in an automobile accident last month, suffering lacerations about the forehead. At last reports he was reported recuperating satisfactorily.

Dr. Cramer to Join Sharples

Dr. Howard I. Cramer, professor of rubber chemistry at the University of Akron, has tendered his resignation from that University and will join the research and development department of Sharples Chemicals, Inc., Philadelphia, formerly known as the Sharples Solvents Corp., on or about July 1. Dr. Cramer was graduated from the University of Akron in 1926, received his Ph.D. degree from Wisconsin in 1929, served as a research chemist with Goodyear for several years, and took over the courses in rubber chemistry given at Akron in 1933 when Dr. H. E. Simmons, who was giving the courses, was made president of the University. Dr. Cramer is currently secretary of the Rubber Division, A.C.S.

DONALD FREY, secretary of the Precision Roll & Rubber Co., Yardville, N. J., has become president of that company, succeeding THOMAS D. DANTZLER, who recently resigned from the company.

F. A. LANG, operating manager of the mechanical division of the B. F. Goodrich Co., has assumed the responsibility for rubber heel and shoe sales, formerly carried by M. D. MASKREY, resigned.

JAMES B. MULLEN, until recently associated with the E. H. Edwards Co., of Chicago, has joined the Oak Rubber Co., Ravenna, Ohio, in the position of assistant sales manager.

GEORGE R. KELTIE has been elected president and treasurer of the American Wringer Co., Woonsocket, R. I., to succeed the late HAROLD T. MERRIMAN. MR. KELTIE was formerly vice-president, a post to which the directors elected HARRY A. SCHLOSSER, formerly factory manager.

VIRGIL KNISELY, for several years advertising counsel for the Lima Cord Sole & Heel Co., Lima, Ohio, has been appointed general sales manager of that company. In recent years he has been in charge of promotion of Neo-Cord soles and heels to industrial plants.

WEBSTER N. JONES, director of engineering, Carnegie Institute of Technology, Pittsburgh, Penna., and previously associated with Goodrich, has been appointed a member of the Pennsylvania State Council on Defense.

MAX DURST, president of the Keystone Brass & Rubber Co., Inc., Philadelphia, Penna., has returned from a 20,000 mile trip through South America where he made an extensive study of business conditions.

ALBERT M. CREIGHTON, former president of the Boston Woven Hose & Rubber Co., is now acting as District Coordinator in the Boston area for the Defense Contract Service.

VALUE OF RUBBER PRODUCTS SHOWED INCREASE IN 1940

Net sales value of manufactured rubber products shipped during 1940 totaled $700,478,000, as compared with a revised figure of $654,323,000 for 1939, according to estimates of the Rubber Manufacturers Association. The 1940 estimate was based on reports received from 203 manufacturers and represents approximately 75% of all sales made by American rubber manufacturers.

The largest increase was in rubber products other than tires and accessories. The latter accounted for a total of $403,504,000 against $399,293,000 in the previous year, while other rubber products in 1940 had a value of $296,974,000 compared with $255,030,000 in 1939.

However, the value of tires and tire accessories showed a pronounced increase in the final quarter over the third three months of the year, amounting to $116,805,000 against $92,191,000 for the earlier period. In the last three months of 1940 passenger car, truck and bus casings were valued at $95,678,000. This compared with $74,133,000 in the previous quarter.

Bicycle tire values dropped in the final quarter to $1,244,000 from a total of $1,713,000 in the third quarter. The total for 1940 was $5,145,000 against $5,457,000 in 1939.

The value of other rubber products in the final three months of last year was $92,476,000 compared with $72,011,000 in the earlier quarterly period. Hard rubber goods show a sharp increase in value during the fourth quarter, rising from $3,005,000 to $4,578,000.

Industrial sponge rubber, chemically blown, also increased in value to $2,562,000 from $1,552,000 and foamed latex rose from $1,299,000 to $2,099,000. The value of sporting goods, toys and novelties, however, dropped from $1,685,000 to $1,598,000.

MAKE PLANS TO EXTEND SCRAP RUBBER COLLECTION

Another indication of the concern being experienced in this country over rubber supplies is reflected in the plans now being made by government authorities to extend the collection of scrap rubber. At the present time, collections of scrap are centered in only a few large areas, mostly adjacent to rubber manufacturing or reclaiming centers. The plans will be formulated to extend collections to remote areas.

A meeting between W. L. Finger, assistant secretary of the Rubber Manufacturers Association, now working with the Office of Production Management, and the members of the Scrap Rubber Defense Committee of the National Association of Waste Material Dealers, was held in Washington on May 8. No report of this meeting has been issued at this writing. The N.A.W.M.D. committee is composed of Edward B. Friedlander and Julius Muehlstein, co-chairmen, and Alex Schulman, Nat. E. Berzen, and Irwin M. Desser.

It was revealed on May 5 that the government has revoked all licenses for shipment of scrap rubber to Japan and occupied parts of China. Although no explanation for the move was made, it was understood that it was designed both to check one German source of supply and to conserve scrap rubber for the defense needs of the United States.

NEW DEFENSE CONTRACTS GIVEN TO RUBBER INDUSTRY

Several new contracts calling for the delivery of products needed for the National Defense Program were issued to rubber manufacturers in the past few weeks. Entrance of the General Tire & Rubber Company into the barrage balloon manufacturing business was confirmed when the War Department certified that $70,000 in additional plant facilities was required by that concern, the certification indicating that the new facilities will be used for making barrage balloons.

Goodyear has been making barrage balloons for more than a year, Firestone has made some of them and is enlarging its facilities to handle additional business, while Goodrich, although not actually engaged in turning out balloons, is supplying fabric for their manufacture.

Included among rubber manufacturers receiving new contracts in recent weeks were the following: Goodyear, rubber mountings, $1,759; Goodrich, parachute cushions, $20,600; Firestone, tires and tubes, $80,268; Goodyear, life preserver vests, $155,000. In addition to these contracts, Goodyear has received orders for airplane wing parts and aircraft brake assemblies and Firestone for gun mounts and carriages. Firestone is also constructing a plant for making shells.

PRODUCTION OF THIOKOL IS DOUBLED BY NEW UNIT

A new plant for the production of Thiokol, which has a capacity of more than 150,000 pounds per month, has been opened at Midland, Michigan, by the Thiokol Corporation and the Dow Chemical Co. Production capacity of the two units now operating exceeds 330,000 pounds per month. The new unit, which went into full operation only 105 days after ground was broken and which is already operating twenty-four hours, seven days a week, was erected because of the defense program and the growing commercial application of Thiokol.

Officials of the Thiokol Corporation, in announcing the opening of the new plant, indicated that they have already begun to lay plans for the construction of still another unit which would increase present total production capacity by 50%. Construction on the projected plant will begin, it is said, whenever additional Thiokol output is deemed desirable. Dow Chemical manufactures Thiokol exclusively for the Thiokol Corporation.

Final Report on Overman Tire

James J. O'Connell, trustee in bankruptcy for the Overman Cushion Tire Co., Inc., has rendered his final report and accounting to the referee in the action. A meeting was scheduled to be held on May 9 to examine and allow the trustee's report, to declare a first and final dividend, and to discuss other matters relative to winding up the bankruptcy. The trustee's report showed gross receipts of $30,000.00 and disbursements of $25,821.91, leaving a balance on hand of $4,178.09. Claims filed and allowed included general claims of $536,568.34 and priority claims of $43,575.30. Oscar W. Ehrhorn was the referee.

With the two large bulk storage tanks (seen above) recently completed at the Sunray, Texas, plant of the Continental Carbon Co., that company's bulk storage capacity is now more than 2,000,000 pounds of dustless carbon black.

FINANCIAL NEWS

FIRESTONE TIRE REGISTERS $50,000,000 IN NEW BONDS

Early this month the Firestone Tire & Rubber Company placed in registration with the Cleveland office of the Securities and Exchange Commission an issue of $50,000,000 twenty-year 3% debentures, due May 1, 1961. Later it named seventy-eight underwriters of the issue, listing Harriman, Ripley & Co., and Otis & Co. as the principal underwriters. The City Bank Farmers Trust Co. has been named trustee, and J. P. Morgan & Co. and the Cleveland Trust Co. as paying agents.

Of the proceeds to be received by Firestone from the sale of these debentures, $45,938,000 will be applied to the redemption on or about July 1, 1941, at 103 per cent of all the $44,600,000 principal amount of the company's ten-year 3½ per cent debentures, and the remainder will be added to the cash funds of the company and used in the ordinary course of the business of the company and its subsidiaries.

Consolidated income statements show that income available for interest and Federal taxes over the past ten fiscal years after depreciation has averaged $8,979,905; for the past five fiscal years such income after depreciation has averaged $11,457,819; and for the fiscal year ended October 31, 1940, after charges for depreciation amounting to $7,281,568, income available for interest and Federal taxes totaled $14,608,534.

A fixed minimum sinking fund is to be established to retire, by May 1, 1942, and by each May 1 and November 1 thereafter, $625,000 principal amount of debentures, or at the rate of $1,250,000 a year.

The indenture also provides for an additional earnings sinking fund to retire, by May 1, 1942, and by each May 1 thereafter, either $750,000 principal amount of debentures or such lesser amount as may be retired through the application of a sum equivalent to 10 per cent of the consolidated net income for the preceding fiscal year.

To the extent that retirements through the additional earnings sinking fund are less than $750,000 in any year the amounts are to accumulate and be payable in subsequent years.

Kleinert Rubber Company

For 1940: Net profit of $143,757, equal to 87c each on 164,140 capital shares, excluding 25,860 treasury shares, which compares with $289,364, or $1.76 a share, in the previous year. The 1939 report included earnings from the company's English branch, while the 1940 report excludes such earnings. Current assets as of December 31, 1940, amounted to $2,123,585 and current liabilities to $345,171, which compares with $2,312,098 and $375,756, respectively, at the end of the previous year.

Thermoid Company

First Quarter: Unaudited report indicates net profit of $210,343, equal to 38c each on 476,388 common shares after preferred dividends, which compares with $135,208, or 22c a share, last year. For the twelve months ending March 31, net profit amounted to $677,875, or $1.17 a share, compared with $502,439, or 80c a share, in the previous year.

General Cable Corporation

First Quarter: Net profit of $1,006,006, equal to 65 cents each on 671,858 no-par shares of common stock after quarterly dividend payments on 150,000 shares of 7% preferred and allowing for dividends on 306,689 shares of $4 Class A stocks. This compares with $727,425, or 23 cents a share, in the corresponding period of 1940.

Hewitt Rubber Corporation

For 1940: Final audited report reveals net earnings of $280,701, equal to $1.68 per share on common stock outstanding, which compares with $358,810, or $2.13 a share, reported for the previous year. The company has no funded debt or preferred stock.

Baldwin Rubber Company

First Quarter: Unaudited report indicates net profit of $248,979, equal to 79 cents each on 315,654 capital shares, which compares with $109,875, or 35 cents a share, last year. For the nine months ended March 31, net profit amounted to $539,040, or $1.71 a share.

Dryden Rubber Company

For 1940: Net income of $400,009, which compares with consolidated net income of $152,504 reported for the previous year. The company reports increased activity for the first quarter of 1941.

Anaconda Wire & Cable Co.

First Quarter: Preliminary report indicates net income of $748,811, equal to $1.77 each on 421,981 common shares, which compares with $129,280, or only 31 cents a share, in the corresponding quarter of the previous year.

Monsanto Chemical Co.

First Quarter: Net income of $1,354,291, equal to 98 cents a share, which compares with $1,642,037, or $1.23 a share, in the corresponding period of 1940. Sales in the first three months of 1941 reached $14,442,926.

Tyer Rubber Company

Year Ended February 28: Net income of $95,111, which compares with $103,696 reported for the previous fiscal year. The company anticipates an improved showing for the coming year.

Servus Rubber Company

Year Ended Feb. 28: Net income of $194,107, equal to 99 cents each on 172,761 shares of common stock, which compares with $161,376, or 80 cents a share, in the preceding fiscal year.

Brown Rubber Company

Fifty-three Weeks to Jan. 4: Net profit of $33,013, equal to 16 cents each on 200,000 capital shares, which contrasts with a net loss of $63,787 reported for the year of 1939.

Mansfield Tire & Rubber Co.

For 1940: Net loss of $297,913, which compares with a net income of $501,796 reported for 1939. Net sales in 1940 amounted to $8,109,471, as compared with $12,408,321 in the preceding year.

Lima Cord Sole & Heel Co.

First Quarter: Net income of $20,662, equal to 18 cents each on 111,689 capital shares, which compares with $2,660, or 2 cents a share, in the corresponding quarter of the previous year.

Perbunan Production Started

The actual production of Perbunan, or Buna N, was started at Baton Rouge, Louisiana, at the $3,250,000 plant of the Standard Oil Co. of Louisiana, on April 21. Initial production is approximately 5 tons a day, but this rate will be stepped up appreciably in about four months when full production facilities will be put into operation, according to Standard Oil officials. Buna is also being made by Firestone at a plant in Akron under special license.

Form Fulton Rubber Company

The Fulton Rubber Company has been organized at Canal Fulton, Ohio, to manufacture drug sundries. Equipment is already being installed and operations will start shortly. Clayton H. Carl heads the new company as president and factory manager; Henry Treish, formerly with Elite Rubber Co., is vice-president and superintendent; Willard Mottice is secretary-treasurer; and George Muehleisen will act as general manager.

NEW CANADIAN RUBBER GROUP IS FORMED IN MONTREAL AREA

Rubber and plastics chemists and production men in the Montreal area of Canada, who have long felt the need of a technical and social organization of their own, recently banded together to form the Montreal Rubber and Plastics Group. This is the second such group

M. F. Anderson
Head of New Canadian Group

in the Dominion, the other being the Ontario Rubber Section of the Canadian Chemical Association which has functioned for several years in the Toronto-Hamilton-Kitchener section of the Dominion.

The idea for a separate Montreal group originated early this year with Dr. R. V. V. Nichols, of the Chemistry Department of McGill University; R. P. Bales, of the Dominion Rubber Co., and A. B. Lewis, chief chemist of the British Rubber Co. of Canada. This trio issued a call for an organization meeting, which was held at McGill University on March 28.

Approximately seventy-five rubber and plastics men attended the organization meeting, heard the aims of the proposed group explained by Mr. Bales, approved the idea, and elected the following officers: *Chairman,* M. F. Anderson, development manager, Dominion Rubber; *Vice-Chairman,* J. H. McCready, Hale Brothers; *Secretary-Treasurer,* Dr. R. V. V. Nichols. The following were named as members of the Program and Membership Committee: A. B. Lewis, R. P. Bales, F. A. Todds (Northern Electric Co.), and P. Gunter (Mack Moulding Co.).

The first official meeting of the group was held on April 25 at McGill. The meeting was preceded by an informal dinner at Murray's Restaurant, with approximately 70 members and guests attending.

The principal speaker at the meeting was W. H. MacHale, advertising manager of the American Cyanamid Co., who gave an interesting, informative and witty talk on modern trends in the plastics industry under the title, "The Surface Has Barely Been Scratched." This talk was followed by a sound film titled, "Modern Plastics," shown through the courtesy of *Modern Plastics Magazine.* There were approximately 100 at the meeting.

At the business session it was announced that the next meeting of the group would be held in October, and that there would be some seven meetings in all during the 1941-42 season. Annual dues, it was announced, are $2.00 per member, payable to the secretary-treasurer.

Supplies from the Air

Equipment designed to expedite delivery of supplies, including food, water and gasoline, has been perfected by the Firestone Tire & Rubber Co., Akron, and has passed successful tests conducted recently at Wright Field, Dayton, Ohio. The new equipment consists of an adjustable container, made of rubberized fabric, in which food, guns and ammunition can be dropped to the ground in loads up to 200 pounds. Most radical part of the development, it is said, is the rubber bottle which holds liquids. These bottles can be dropped from any height.

Chicago Plans Plastic Symposium

A Symposium on Plastics will feature the next meeting of the Chicago Group, Rubber Division, A.C.S., to be held on Friday, June 6, at the Congress Hotel in Chicago. Speakers will include T. W. Sharp, Carbide & Carbon Chemicals Corp.; W. F. Cullom, Jr., Celluloid Corp.; and W. C. Goggin, Dow Chemical Co. Approximately 45 manufacturers and suppliers of rubber chemicals and compounding ingredients will exhibit their products in connection with the meeting. The programs of the group are prepared by Dr. H. A. Winkelmann, of the Dryden Rubber Co.

Akron Outing on June 20

The annual summer outing of the Akron Group, Rubber Division, A.C.S., will be held on the afternoon and evening of Friday, June 20, at the Silver Lake Country Club, Akron. The golf course will be open all day and dinner will be served at 7:00 P.M. sharp. V. K. Kitch, of the Akron Chemical Co., will serve as general chairman of the outing, and Ed Nahm, of Naugatuck Chemical, as vice-chairman. J. B. Waite, of Dugan & Campbell, and Lawrence Baker, of Firestone, will be in charge of golf arrangements.

NEW YORK GROUP OUTING TO BE HELD ON JUNE 6TH

The annual outing of the New York Group, Rubber Division, A.C.S., will be held this year at the North Jersey Country Club, Preakness, N. J., on Friday, June 6. The recent mail ballot taken to determine whether the outing should be held on Friday or Saturday revealed an overwhelming preference for Friday. The vote on whether it should be held in New Jersey or in Westchester County, N. Y., was close, but the Executive Committee decided on New Jersey for this year.

The North Jersey Country Club is approximately four miles out of Paterson on the road to Pompton, officially known as the Hamburg-Pompton Turnpike. It is quite close to the Alps Castle, site of previous outings held in New Jersey.

An active program of fun and sports has been planned by S. C. Stillwagon *(India Rubber World)* who will act as chairman of the outing. The events planned, together with those in charge of each, follow: *Tug-of-War,* L. Lawrence (DuPont); *Soft Ball,* F. Conover (Naugatuck Chemical); *Horseshoes,* W. Lamela (Okonite); *Boccie,* G. H. Provost (U. S. Rubber); *Golf,* W. L. Sturtevant (Manhattan Rubber) and Pete Murawski (DuPont); *Tennis,* D. A. Comes (Farrel-Birmingham); *Baseball Throw,* John M. Ball (Vanderbilt); *Darts,* J. H. Ingmanson (Bell Telephone Labs.); *Clock Golf,* E. L. Wright (General Atlas). Assisting Mr. Stillwagon will be J. W. Crosby (Thiokol), B. B. Wilson *(India Rubber World),* and Peter Pinto (RUBBER AGE).

The North Jersey Country Club is reported to have an excellent 18-hole

Routes to North Jersey Club

golf course. Green fees, which must be paid direct to the club, will be $2.00 up to 4:00 P.M. and only $1.00 after 4:00 P.M. An 85-cent lunch will be available at the club for those who come early. Tickets for the dinner are $2.00 for members and $3.00 for non-members.

LOS ANGELES NEWS

Ed Royal and T. Kirk Hill have returned from a tour of the Republic of Mexico. They visited most of the important cities in the country as well as shrines and scenic spots. They also visited the leading rubber manufacturing plant in Mexico City as well as one or two smaller plants.

The U. S. Rubber Company is now manufacturing de-icers for the airplane industry. This is a new product here and each item is custom-made.

A strike of rubber workers (C.I.O.) which hampered production for the Darnell Corporation, Long Beach, for a couple of months has been settled. The increased force now at work has raised production much above the volume before the strike was called.

Firestone Tire and Rubber Company has completed a new building, with 33,000 square feet of floor space, needed because of increased production of bullet-proof fuel tanks.

W. S. Wolfe, factory manager of Goodyear's domestic plants, was a two-day visitor in Los Angeles during the past month.

Phil Ritter of the U. S. Rubber Company, who was suddenly taken seriously ill two months ago and who spent considerable time in the hospital, is now around but is at this writing unable to return to his job.

Bill Richardson, general sales manager for the mechanical division, Goodrich, Akron, spent some time in Los Angeles early in May.

U. S. Rubber Company is working on an installation preparatory to bulk handling of carbon black.

Mitchell Tire and Rubber Corporation, 2130 San Fernando Road, has greatly enlarged its plant during the last two months. This firm has been showing constant growth during the last year.

T. R. O'Brien of the New York office of Goodyear, where he is in charge of crude rubber inspection, spent a couple of weeks in Los Angeles in May.

Another man in the Goodyear plant in Los Angeles has completed 25 years of service and received his pin and award of $100. He is A. A. Austin, who hired into Department 141 in Akron as an inspector in 1916 and transferred to California in 1920. He has served as shift foreman in Department 141 for 21 years.

Charles Lamb, vice-president and general manager of the West American Rubber Company, has received word of the death of a brother in England and the bombing of a sister's home. The cable did not state whether the brother had died a natural death or was a victim of the war. The sister was not injured by the bomb that destroyed the home but she suffered from nerve shock, Mr. Lamb states, from which she has now recovered.

Opens New Bedford Mills

Transformation of the textile mill of the Goodyear Tire & Rubber Company at New Bedford, Mass., which has been idle for several years, into an assembly plant for pneumatic boats, bullet-seal fuel tanks, and possibly for barrage balloons, has been announced by the company. At the same time it was announced that the Pliofilm plant at St. Mary's, Ohio, would be doubled in size. The molded goods plant at St. Mary's, at which rubber tracks for Army tanks are made, is completing its third expansion since the factory was laid out in 1939.

Round-Table at S.A.E. Meeting

A round-table on "The Rolling Resistance of Pneumatic Tires as a Factor in Car Economy" is included in the program planned by the Society of Automotive Engineers for its Summer Meeting, to be held at White Sulphur Springs, West Virginia, from June 1 to 6. Participating in the round-table, which will be held in the ballroom of The Greenbrier on Wednesday morning, June 4, will be W. F. Billingsley (Goodrich), R. D. Evans (Goodyear), W. H. Hulswit (U. S. Rubber), and E. A. Roberts (Firestone). National defense will be the keynote of the meeting.

CRUDE RUBBER CONSUMPTION SET AT 648,500 LONG TONS

According to the annual survey conducted by the Leather and Rubber Division of the Bureau of Foreign & Domestic Commerce, consumption of crude rubber in the United States during 1940 reached the all-time high of 648,500 long tons, an increase of 9.5%, or 56,500 tons, over the 1939 official estimate of 592,000 tons. The figure for 1940 released by the Rubber Manufacturers Association was 618,349 tons.

According to the official estimate, stocks at the year-end amounted to 288,900 tons, an increase of 130%, or 163,100 tons, over the 125,800 tons reported at the end of 1939. The R. M. A. had estimated stocks at the end of 1940 at 318,486 tons. A major part of the increase in stocks was accounted for by Government-held stocks under both the barter and purchase plans. According to the survey, Government-held stocks at the end of 1940 amounted to 112,494 tons.

Detroit Group Holds Meeting

A meeting of the Detroit Rubber and Plastics Group was scheduled to be held on Friday, May 9, at the Hotel Whittier in Detroit, Mich. According to the program, a Symposium on Adhesives, in which rubber, reclaim, latex and asphalt adhesives would be discussed, was to have been held. Scheduled to have participated in the symposium were R. L. Wheeler (Chrysler), Sam Adinoff (St. Clair Rubber), and John S. Goodman (Collord). R. J. Shroyer (Fisher Body), E. J. Fickers (Baldwin), and J. D. Morron (U. S. Rubber) were to have led discussions. A movie, "Diesel—The Modern Power," was to have been shown by General Motors. A complete report on the meeting will be made in our next issue.

Part of Aetna Plant Sold

Most of the larger buildings comprising the plant of the Aetna Ruber Company at Ashtabula, Ohio, have been sold to the Ashtabula Industrial Corporation, recently organized to increase the industrial output of that city. Some of the buildings involved in the sale had not been in use for some time, since the company moved its major manufacturing activities to Cleveland. Aetna Rubber has retained a few small buildings and will continue to use them for grinding scrap rubber.

AN APPROVED CLAY

CROWN CLAY

SOUTHEASTERN CLAY COMPANY

AIKEN, SOUTH CAROLINA

NEWS IN BRIEF

Gulton Metals Refining and Chemical Corporation, a new firm, formed for the manufacture of zinc oxide and other metallic compounds, has leased the former power house and substation of the Public Service Electric & Gas Co., in Metuchen, N. J.

In order to provide tractor and implement owners with full information concerning tractor and implement tires so that they may receive all the service originally built into their tires, the Rubber Manufacturers Association, 444 Madison Ave., New York City, has issued a booklet entitled "Farm Tires—Care and Service." It is available without cost.

Contract for the construction of an administration building at its plant in East Rutherford, N. J., for general offices and other purposes, has been let by the Flintkote Co. The new structure will be two stories in height.

With two large bulk storage tanks recently completed and added to the facilities of its Sunray, Texas, plant, the bulk storage capacity of the Continental Carbon Co. is now well in excess of 2,000,000 pounds of dustless carbon black. The new tanks were constructed to handle either the package or the bulk form of black.

Exclusive distributorship for the patented "Flexrock" rubber gasket manufactured by the B. F. Goodrich Co. has been given to the Flexrock Corp., a newly formed company. T. D. Nathan, inventor of the gasket, is general sales engineering manager of the new company.

Atlantic Instrument & Tool Co., Inc., has been organized at 418 Broome St., New York City, to manufacture precision measuring instruments, adjustable snap gauges, and other tools.

Vol. 2, No. 6 of the *Clark Pictorial*, house organ of the Clark Tructractor Division of the Clark Equipment Co., Battle Creek, Mich., is a special Defense Edition. The part played by the company's equipment in preventing plant bottlenecks is stressed.

The Firestone Employes Protective Association, independent union maintained at the Firestone plant in Akron, has been officially disbanded by action of its board of directors. Lack of interest and finances were attributed to the dissolution.

Since the beginning of the European war traffic of crude rubber through Panama has increased to the point where approximately 85% of all imports into the United States now come through that country. Prior to 1935 practically all rubber was routed through Suez.

High pressure rubber hose capable of withstanding internal pressures of 15 tons a square inch and more is predicted for the immediate future by research engineers of the B. F. Goodrich Co. Testing equipment that creates such extreme pressure is already in use in the company's laboratories.

The National Association of Independent Tire Dealers has removed its executive offices from New York City to 30 North LaSalle Street, Chicago. C. C. Simpson was recently appointed executive director.

Manufacturing activities at the new plant being constructed by the Dayton Rubber Manufacturing Co. near Waynesville, North Carolina, are expected to start by July. Industrial and automotive rubber parts, rubber equipment for textile plants, and rubber soles for shoes will be made at the new plant.

The latest issue of *The Royle Forum*, interesting house organ published by John Royle & Sons, Paterson, N. J., is devoted to the manufacture of reclaimed rubber. It is profusely illustrated.

Specially designed rubber insets, which replace heavy chains and springs, are being used by the Anthony Co., manufacturers of low-mounted hydraulic hoist dump bodies, in its new line of super hoist models. The rubber insets prevent both "over-run" and "kick back" when dumping a load or spreading gravel.

U. S. Rubber's "Innacush" Tire.

The "Innacush" tire, especially designed for small industrial tractors, has been introduced by the U. S. Rubber Co. It is built with an under-tread cushion of resilient rubber which is said to give the tire unusual shock absorption properties.

Nonslip Pulley Covering Co., Buffalo, N. Y., has introduced "Nonslip Rubberpull," developed to prevent belt slippage. The product, which has a rubber base, is compounded so that it will stick to the pulley face even when subjected to extreme pulling conditions. Supplied in liquid form, it is easily brushed on any type of pulley.

Jacobus F. Frank, representative for purified and other rubbers of the Netherlands East Indies Government Estates in the United States, has moved his offices from 132 Front Street to 120 Wall Street in New York City. The telephone number is WHitehall 3-0663.

A new booklet, called "Four Vital Spots," which tells how the average driver may extend the life of his tire by 20% and more by following a few simple rules, has been issued by the U. S. Rubber Co.

Specially constructed shoes, with foam latex two inches thick for soles, which absorb much of the shock of landing, are now being used by the new parachute troops of the U. S. Army.

Goodrich has announced a new line of specially constructed exhaust hose for conducting fumes and dust. The hose, available in sizes ranging from 2 to 12 inches in diameter and in lengths of 8, 15 and 25 feet, is light and flexible and easily bent at short angles.

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CANADIAN NEWS

Six new appointments have been announced recently by the sales department of the Dominion Rubber Company, Ltd., Montreal.

Establishment of separate sales divisions in the provinces of Alberta, Saskatchewan and Manitoba led to three of the appointments. J. J. Innes, who has been field service representative for western Canada, has been named tire sales manager for Manitoba. Mr. Innes, a resident of Winnipeg for the past 15 years, became associated with the company in 1927. A. L. Ennis, who has been with the company since 1920 and has been Regina branch sales manager for the past five years, has been named divisional sales manager for Saskatchewan. Jack Maybin, who came to Canada from Belfast at the age of eighteen and started with Dominion in the Regina warehouse in 1912, has been made divisional sales manager for Alberta.

The other three appointments concern the Ontario district. G. A. Lamond has been appointed sales manager of mechanicals and sundries for the central division, Toronto. He was formerly assistant sales manager for the same division in Quebec. J. C. Alexander, formerly special sales representative at Winnipeg, has been named assistant to Mr. Lamond at Toronto. Charles Camsell, Jr., has been named sales representative of the company's mechanical division in northern Ontario and Quebec. Mr. Camsell has spent many years in geological surveying and prospecting work.

The Firestone factory was one of several Hamilton industrial plants visited by a party of sixteen members of Parliament from Ottawa recently. The extensive tour was concluded with a banquet at the Royal Connaught Hotel at which the visiting members expressed themselves as well pleased with the war efforts of Hamilton's industries. Among the speakers at the dinner was Mr. Maybury of the Firestone company.

Among the twenty-five members of the Canadian Chamber of Commerce appointed to serve with an equal number of members of the Canadian Manufacturer's Association on a joint committee to undertake a survey and co-ordination of Canadian industrial production for war purposes are C. S. Band, vice-president of Gutta Percha and Rubber, Ltd., Toronto, and W. H. Funston, Jr., president of the Firestone Tire and Rubber Company, Ltd., Hamilton.

Arthur S. Torrey, Montreal, who is a director of Granby Elastic Web Company of Canada and of the Phillips Electric Works, Ltd., was recently named a director of the Anglo-Canadian Telephone Company.

The Seiberling Rubber Company of Canada, Ltd., has just let contracts for the erection of a warehouse on vacant land at the front of the present Paton Road plant in Toronto. The new building, of brick and steel construction, will cover an area of approximately 100 by 100 feet and is expected to be ready for use by the end of June. Need for the new building has been growing increasingly evident as the company has been called on to store a large inventory of crude rubber as well as to store finished goods for the Department of Munition and Supply, Ottawa.

Although crude rubber imports into Canada in 1940 were the greatest in history, each month of 1941 continues to show a continued increase over the same period in the previous year. Imports in February amounted to 8,073,008 pounds compared with 7,373,877 in February, 1940. For the first two months of the year, rubber imports are up 15.6 per cent over the same months in 1940.

Of the contracts in excess of $5,000 awarded by the War Supply Board, Ottawa, to Canadian rubber companies for the period February 21 to March 21, inclusive, all but two were for rubber clothing.

The largest contracts were granted to Viceroy Manufacturing Company, Ltd., Toronto, which received two orders totalling $226,527 on March 7 and a $53,664 order on March 12, and to Dominion Rubber, which received a $10,080 contract on March 7, a $26,477 order on March 12, and a $79,100 order on March 21.

Other clothing contracts were awarded to Miner Rubber Company, Ltd., Granby, Quebec, $17,024 on February 28 and $15,600 on March 21; Kaufman Rubber Company, Ltd., Kitchener, $17,920 on February 28 and $10,075 on March 7; and to British Rubber Company of Canada, Ltd., Montreal, $9,840 on February 28.

Contracts for personal equipment were granted on March 21 to Dominion for $30,000 and to B. F. Goodrich Rubber Company, Ltd., Kitchener, for $12,800.

A. L. Mailman, president of the British Rubber Co. of Canada, Ltd., Montreal, has been elected a director of C. W. Lindsay and Company, Ltd. Mr. Mailman is also president of the Pal Blade Company and a director of the Montreal Life Insurance Company.

W. H. Marsh, vice-president of Canada Wire and Cable Company, has assumed the additional duties of treasurer, a position he formerly held until about two years ago. Mr. Marsh succeeds J. E. McCallum who recently resigned. A. R. Winnett has been appointed assistant treasurer.

Prepare A.S.T.M. Program

According to present plans, some 17 separate technical sessions will be held at the 44th Annual Meeting of the American Society for Testing Materials which will be held at the Palmer House in Chicago from June 23 to 27. The 6th Exhibit of Testing Apparatus and Related Equipment and the 4th Photographic Exhibit will be held in conjunction with the meeting, the latter devoted to the theme "Materials, Testing and Research." Several committee reports and technical papers are planned by Committee D-11 on Rubber Products. The 16th Edgar Marburg Lecture will be presented by Dr. Harry L. Fisher, director of organic research, U. S. Industrial Chemicals, Inc., previously associated with U. S. Rubber for many years, on the subject, "Natural and Synthetic Rubbers."

Wants Equipment Catalogs and Prices

L'Institute des Recherches du Caoutchouc en Indochine, 26 Rue Lagrandiere, Saigon, French Indo-China, is interested in securing specifications, prices, and conditions of payment, from American manufacturers of the following equipment: *Laboratory Testing Equipment*, for both physical and chemical tests; *Rubber Manufacturing Equipment*, including washers, mixers, calenders, vulcanizers, presses, molds and latex dipping equipment; *Temperature and Control Instruments;* and *Special Apparatus for the Study of Latex*. All quotations should be based on delivery to the Institute, which was recently created by planters in French Indo-China.

Micro Velva Filler

A new filler for hard rubber and molded rubber goods, called Micro Velva, has been introduced by the Carbola Chemical Co., Inc., Natural Bridge, N. Y. The filler, a pulverized natural product, is available in two grades, one having 96% and the other 87% of a particle size ranging from 1 to 5 microns, or about 9 times finer than 325 mesh screen material. According to its producers, Micro Velva has considerable pigmenting properties, wets up quickly, and has some of the characteristics of clay except that it is much finer and whiter.

OBITUARIES

Webster Norris

Webster Norris, who retired in 1937 as technical editor of the *India Rubber World* and who had a long and distinguished career in the rubber industry, died at his home in Hempstead, L. I., on April 20, at the age of 81. Mr. Norris laid claim to being one of the first, if not the first, chemist to be regularly employed by an American rubber manufacturer.

Born in Charlestown, Mass., Mr. Norris received his early education in the public and high schools of that town, and then attended M.I.T. from which he was graduated in 1881 with the degree of bachelor of science. He first worked as an analyst in the steel and sugar refining industries and later served as chief chemist for the Chicago, Milwaukee & St. Paul Railway Co.

In 1887 Mr. Norris entered the rubber industry as a chemist for the old Boston Rubber Shoe Company at its Malden, Mass., laboratory. Subsequently he was made superintendent of one of that company's plants. In 1895 he left Boston Rubber Shoe to join the former Revere Rubber Co. His subsequent connections in the industry included positions with the Gutta Percha & Rubber Mfg. Co. of New York, the Canadian Rubber Co. of Montreal, the Republic Rubber Co. of Youngstown, Ohio, and the New York Rubber Co. He also lectured on rubber technology at M.I.T.

Mr. Norris had an inventive mind and was granted several patents on rubber-working machinery and equipment, including one on a special loop for rubber boots and a roll for rubber mixing mills. A micrometer dial gage was another of his patented inventions. Soon after the *India Rubber World* was founded in 1889, Mr. Norris became one of its regular contributors and in 1917 became a member of the regular staff of that journal, continuing until his retirement from business in 1937. During that period he also conducted a private practice as a consulting rubber technologist.

Funeral services were held on April 22 at the Fairchild Funeral Home in Brooklyn, N. Y., with interment the following day in Cypress Hills Cemetery, Brooklyn. A widow survives.

Harry Tipper

Harry Tipper, sales manager of the Brown Rubber Co., Lafayette, Indiana, was found dead of a heart attack in his room at the Purdue Union Hotel in Lafayette on May 7. He was 61 years of age. Born in England, Mr. Tipper came to the United States thirty-eight years ago to help build the Hudson and Manhattan tunnels in New York City.

Mr. Tipper had a long and varied career in the sales and advertising fields. He was associated with the General Motors organization for eight years, serving as general sales manager of the export division from 1925 until 1931 when the division became the General Motors Export Corporation and continued in the same post with the new company for an additional two years. From 1914 to 1917 he was advertising manager of the Texas Company and during the same period acted as president of the Advertising Club of New York.

Among various posts held by Mr. Tipper during his career were those of vice-president of Visomatic Systems, Inc., publisher of the *Overseas Trader*, and advertising manager of *Forbes*. He helped organize the School of Marketing at New York University in 1920 and served on its faculty for eleven years. He had been associated with Brown Rubber for only a few years at the time of his death. He leaves a widow, three daughters and two sons.

Frederick F. Curtze

Frederick Felix Curtze, chairman of the board of the Columbian Carbon Company, died at his home in Erie, Penna., on May 7 at the age of 83 after an illness of several years. He was also president of the Union Iron Co., Heisler Locomotive Works, and the Erie Manufacturing & Supply Co., all of Erie.

Born in Fairview, Penna., on March 5, 1858, Mr. Curtze left high school to enter the employ of the Erie Trust Co. Thirty years later he was elected president of that institution. Joining Columbian Carbon in 1914, he served as president until becoming chairman of the board in 1940. During his career he had also served as a president and director of several other corporations, including the Coltex Corp. and the Columbian Gasoline Corp. A widow, son and daughter survive.

Robert F. Herrick, Jr.

Robert F. Herrick, Jr., industrialist, died at the Massachusetts General Hospital in Boston, Mass., on May 1, at the age of 47, after a brief illness. He was vice-president of the Essex Wire Corp., the Reed-Prentice Corp., and Scott & Williams, Inc. He was also a director of several other large corporations.

Mr. Herrick was born in Milton, Mass., attended Milton Academy, and took an A.B. degree at Harvard where he was graduated in 1916. He served as a lieutenant in the U. S. Navy in 1919 and later with the British Grand Fleet. He was keenly interested in sport, particularly polo, rowing and squash tennis. He leaves a widow and a son.

Frank T. Lahey

Frank T. Lahey, long associated with crude rubber activities in this country, particularly in the Akron area, died at the age of 69 at his home in Monroe, New York, on March 27. Born in New York City, Mr. Lahey first became interested in the rubber business about the time Akron manufacturers were beginning to put rubber on the wheels of horse-drawn carriages. For many years he was associated with the firm of Poole & Kelly, with which Charles Lowenthal was connected at one time. The company represented Hilbert Simons. Mr. Lahey acted as the company's Akron representative. Regarded as an expert on crude rubber grades Mr. Lahey was also active in the latex field, having received several patents on the use of latex in the textile field.

Louis P. Destribats

Louis P. Destribats, former vice-president and general manager of the old Ajax Rubber Co., died at his home in Trenton, N. J., on April 12, at the age of 73, after a lengthy illness. Born in France, Mr. Destribats served as chief chemist of the French-owned Michelin Tire Co. in Milltown, N. J., for many years, leaving that post to take charge at Ajax Rubber. Funeral services were held on April 15 with interment in St. Mary's Cemetery, Trenton. He leaves a widow, two sons and two daughters.

Changes at Thiokol Corp.

Bevis Longstreth, president of the Thiokol Corp., which maintains offices and laboratories in Trenton, N. J., has announced several changes in personnel. J. W. Crosby is now sales manager; Harry R. Ferguson, manager of special products; and S. M. Martin, Jr., development manager.

The Naugatuck Footwear plant of U. S. Rubber won first prize among the larger plants and the Shoe Hardware Division plant among the smaller plants in the company's safety contest for 1940. The year witnessed the lowest severity rate in the company's history.

The results of a loading study on the effect of carbon black on the electrical conductivity of rubber are discussed in the March, 1941, issue of the *Carbon Black Bulletin*, issued by Godfrey L. Cabot, Inc., Boston, Mass.

Holding that 79 employees of the Cincinnati Rubber Mfg. Co., Cincinnati, Ohio, went on strike in November, 1938, and were not the victims of a "lockout," the Common Pleas Court of Cincinnati recently upheld a previous decision in refusing the employees unemployment compensation for the time they were out.

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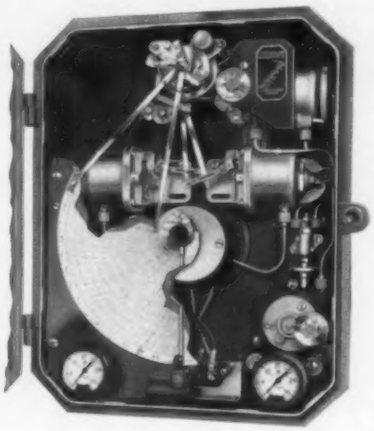
NEW EQUIPMENT

Taylor Ratio Controller

A highly adaptable, easily convertible instrument for applications where a temperature, pressure, rate of flow or liquid level must be controlled in a desired ratio or differential to another related variable is now offered by the Taylor Instrument Companies, of Rochester, New York. With the new direct-setting Taylor ratio controller the ratio is changed



by a simple screwdriver adjustment directly on a calibrated dial throughout the range of 0:1 to 3:1, direct or inverse. With this new instrument it is unnecessary to disturb the processing or remove the chart plate while making ratio adjustments.

The Taylor ratio controller has two measuring systems, one the adjusting system which indicates or records only; and the other, the controlling system, which may either indicate or record. The adjusting system resets the control point of the controlling system through a linkage arrangement according to a predetermined ratio. The action of the controlling system is the same as the 120R Series Fulscopes and may be used as a single duty bi-recording controller when the ratio setting is zero.

Both indicating and recording models of the ratio controller are available with all the features of the 120R Series Fulscope—fixed high sensitivity, adjustable sensitivity, adjustable sensitivity with automatic reset, adjustable sensitivity with pre-act, and adjustable sensitivity with automatic reset and pre-act.

Airflex Flexible Coupling

The Airflex Flexible Coupling, especially designed for connecting Diesel, oil, gasoline or gas engines to any type of driven machinery, has been announced by the Falk Corporation, Milwaukee, Wisconsin. It is said to be particularly fitted for use with motor-driven compressors, single cylinder pumps, and other driven equipment of a similar fluctuating torque nature. The new coupling consists of a special resilient rubber gland lined with a pre-molded, pre-vulcanized cylin-

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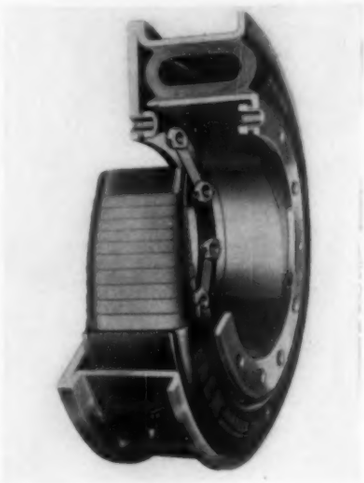

through a threaded valve which will take any hand pump fitting or air nozzle. A rubber-covered metal cap prevents foreign material from entering the valve. The degree of elasticity in the coupling can be varied by changing the air pressure.

Three-Roll Wrapping Machine

A three-roll wrapping machine for wrapping short lengths of hose or tubing, up to approximately 52 inches, which have previously been mounted on mandrels or poles before they are vulcanized, has been developed by the Black Rock Manufacturing Co., Bridgeport, Conn. The two bottom rolls are motor driven, while the top roll is pneumatically controlled

for raising or lowering as required. Additional pressure, other than the weight of the top roll, can be applied through the air cylinder. The bottom rolls are adjustable to accommodate both large and small diameters.

"Quicklock" Doors for Vulcanizers

The "Quicklock" Patent Door, for installation on new or in use vulcanizers, which incorporates a positive acting safety device, was developed some time ago by the Leeds & Bradford Boiler Co., Ltd., Stanningley, Yorkshire, England. Because the door itself does not turn there is no mechanical wear on the joint ring and a simpler hinge suffices. It is adjustable in every direction and a hand lever controls locking and unlocking. Locking can be operated from any one of four positions, from the side or front of the vulcanizer or at either side of the door. The door hinge can easily be changed over to the opposite side of the vulcanizer when desired. The safety feature consists of a relief valve which must be opened before it is possible to start opening the door. This not only dissipates any pressure inside the vulcanizer but also clearly indicates any internal pressure, if this should be present. The relief valve also acts as an ordinary safety valve. The manufacturers are now seeking an American firm interested in producing the "Quicklock" Patent Door under license.

Heavy Duty Span Grinding Mill

Based on the experience gained in the manufacture and practical use of the present Span Grinding Mill, which has a capacity of 200 to 400 pounds per hour and calls for 25 h.p. operation, M. Pancorbo, 155 John Street, New York City, has developed a new, heavy duty grinding mill of the same type, one capable of handling up to 1,000 pounds per hour, requiring 50 h.p. operation. Known as Type X, the new model has a chrome steel shaft, 5 inches thick. The grinding discs are 18 inches in diameter. It is completely enclosed and incorporates improvements in practically all working parts. Safety margins are liberally figured on these parts where maximum loads are concerned. Like the present model, the new heavy duty Span Grinding Mill can be used for reducing all grades of vulcanized soft and hard rubber scrap to fine powder form. It is adjustable for any fineness of powder and feeds automatically. The new model measures 6 feet 6 inches in length, 5 feet 9 inches in height, and 3 feet in width.

Improved Spout Type Magnetic Separator

The popular spout type magnetic separator featured by the Stearns Magnetic Mfg. Co., Milwaukee, Wisconsin, has been improved both in design and construction. It has been streamlined, modernized and simplified, and now operates with much fewer parts. According to the manufacturers, the improvements enable the magnet to provide a deeper, stronger, and more powerful magnetic field than heretofore provided or found in any similar type equipment. The magnet coils are now protected by aluminum plates provided with spacious louvres to allow ventilation, yet keep out dirt and dust. The former gate operating bar has been replaced by a simple arrangement of toggle plate which opens and closes the safety gate automatically as the current is turned off or on.

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LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00
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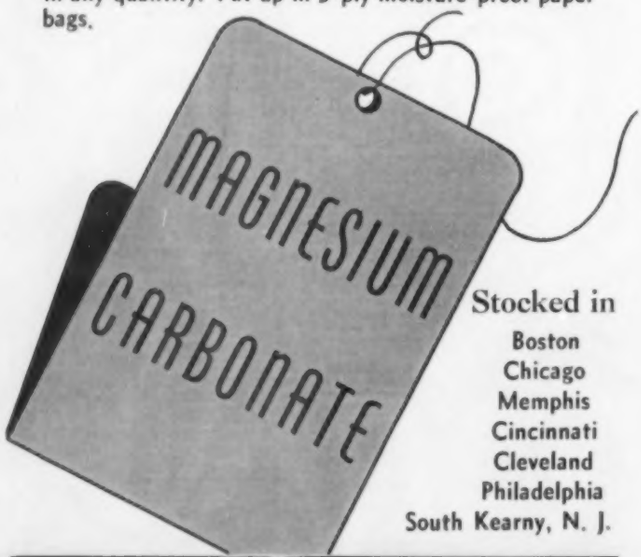

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Allis-Chalmers Low-Head Sifters

A new line of heavy-duty low-head gyratory sifters, one model of which is suitable for the screening of ground hard rubber through 100 mesh, has been introduced by the Allis-Chalmers Manufacturing Co.,

Inc., Milwaukee, Wisconsin. They may also be used for sifting sugar, salt, fuller's earth, peat moss, wood flour, graphite, clays, and many other materials. The new sifters are made in four sizes, the largest being six sieves high, with 30 square feet of cloth area, handling from two to six separations at one time. The sieves can be provided with fine mesh silk cloth or, as in the case with rubber, with woven wire cloth. The main housing measures 38 inches in width and depth. Height varies from 17 to 23½ inches. Side opening boxes are provided for quick and easy removal of sieves. The sifters operate at 300 r.p.m.

BRIEFS . . . . .

Towmotor Co., Cleveland, has introduced the **Model LT-44 Lift Truck** which is similar to previous models but is capable of lifting 4,000 pounds at 15 inches from the carriage. It has a 44-inch wheelbase, with a turning radius of only 72 inches. Overall width is 35 inches and overall length (without forks) is 74 inches.

•

For dampening the pulsation of boiler plant pump governors and to eliminate "jitters" of the gauge hand, a novel device, known as the **Campbell Micro-Bean,** has been developed by the J. A. Campbell Co., Long Beach, California. Literature is available from the company.

•

The **Maxitorq Multiple Disc Clutch**, developed by the Carlyle Johnson Machine Co., Manchester, Conn., is said to be the only one of its type on the market which can be assembled and disassembled without using tools of any kind. The floating plates are absolute when in neutral or disengaged so that there can be no abrasion, friction or heat of any kind.

•

Eastern Engineering Co., New Haven, Conn., has added a new model to its line of midget size pumps. Designated as the **UT Midget Positive Pressure Pump,** it is self-priming, capable of high pressures, and compact. It is recommended for applications in which the location of tanks and containers make the self-priming feature essential.

KOSMOBILE
DIXIEDENSED

DUSTLESS CARBON BLACKS
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THESE FIGURES—THE *"QUALITY TWINS"* OF THE RUBBER INDUSTRY STAND FOR KOSMOBILE AND DIXIEDENSED WHICH IN TURN, STAND FOR THE HIGHEST DEVELOPMENT IN BLACKS FOR RUBBER COMPOUNDING.

REVIEWS

BOOKS

Temperature: Its Measurement and Control in Science and Industry. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York City. 6 x 9 in. 1362 pp. $11.00.

As indicated in its foreword, this book is the record of the symposium on temperature held in New York in November, 1939, under the auspices of the American Institute of Physics with the cooperation of the National Bureau of Standards and the National Research Council, and officers and committees of several scientific and technical organizations, including the American Chemical Society and the American Society of Mechanical Engineers. The book includes all of the symposium papers, with discussions, together with twenty-five tables of generally useful data, a glossary of technical terms, and complete author and subject indexes.

The arrangement has been designed to make the book most convenient both for reference and study. It has been divided into thirteen chapters, as follows: *Temperature and Temperature Scales; Precision Thermometry; Education; Natural Sciences; Temperature in Biology; Temperature and Its Regulation in Man; Automatic Temperature Regulation and Recording; Special Applications and Methods; General Engineering; Metals and Ceramic Industries; Oil Industries; Optical and Radiation Pyrometry;* and *Thermometric Metals and Alloys.* Most of the papers published have extensive bibliographical references. Although very little actual reference to rubber is made in the volume, the data presented is, of course, of value to rubber engineers.

•

Plastics in Industry. By "Plastes." Published in England. Available from Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 5½ x 8½ in. 241 pp. $5.00.

This is a full and frank discussion of plastics, with as much attention given to its disadvantages as to its more numerically advantages. It has been compiled primarily for industrialists with the object of clarifying many confused ideas regarding plastics and the plastics industry. The authors, writing under the name of "Plastes," decry the sensationalism which has accompanied the growth of the industry and set forth clearly a real picture of the potentialities and limitations of plastics, believing such a true picture is essential to the well-being of the industry.

First defining the various types of plastics commercially available, the authors then discuss specifications, molding and fabrication technique, and engineering and chemical machinery and equipment, following which they devote several chapters to explaining the use of plastics in specific industries, including the electrical, aircraft, automotive, textile and building fields. One chapter is devoted to "Synthetic Rubber in Modern Industry," although the authors take the stand that these compositions should be called rubber-like plastics, rather than synthetic rubbers.

The book includes thirty-two excellent illustrations, several diagrams and charts, and a subject index.

•

Abstracts of Patents Relating to Rubber Latex. Compiled by T. R. Dawson and R. W. Parris. Published by the British Rubber Publicity Association, 19 Fenchurch St., London, E.C. 3, England. 5½ x 8½ in. 136 pp.

The last edition of "Rubber Latex," the booklet which treats of the source, production, treatment and application of latex, first issued in July, 1928, by the Rubber Growers Association, whose promotion activities are now in the

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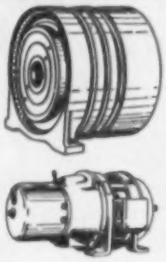

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REVIEWS (CONT'D)

hands of the British Rubber Publicity Association, contains a summary of British patents ending with No. 433,795. A survey of these patents covering the series from December 19, 1935, to May 17, 1940, resulted in the collection of approximately 800 specifications dealing with the treatment and applications of latex. Abstracts of these additional specifications are included in the present volume, which is issued as a supplement to the last edition of "Rubber Latex," that issued in April, 1936.

Like editions of the parent book, the supplement has complete author and subject indexes, compiled mainly in relation to the articles made or to the methods and processes used, so that essentially they are indexes for users of latex. An American edition of "Rubber Latex" is available from the Chemical Publishing Co., Inc., 234 King Street, Brooklyn, N. Y., at $2.00 per copy.

•

Patent Fundamentals. By Leon H. Amdur. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 5½ x 8½ in. 305 pp. $4.00.

This book has two major aspects, the first to enable the layman and the student to attain a rapid, yet sound, understanding of the United States Patent system, and the second holding direct appeal to those already versed in the intricacies of patent law. The tyro will be especially interested in the chapters discussing patentable items, the purpose and operation of Letters Patent, and innovations and improvements which constitute invention, while the initiated will appreciate the chapters dealing with the method of classifying patents and the question of invention. The preparation and prosecution of an actual patent is fully set forth in the book, with reproductions of all papers and memoranda included. There are nine chapters in all, plus a subject index.

BOOKLETS, CATALOGS, Etc.

Quadrafos (Sodium Tetraphosphate). Rumford Chemical Works, Rumford, R. I. (American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City, distributors).

The chemical and physical properties and unique characteristics of Quadrafos, brand name for sodium tetraphosphate, which make this new product the solution to many industrial problems, are described in this booklet. Its ability to condition hard water, deflocculate solids, and prevent corrosion suggests many new fields for investigation. Quadrafos finds application in the rubber industry as a deflocculating agent for various fillers, such as clays, to make them more readily dispersible in rubber compounds. It may also be used as a conditioner of the water used to wash dusting agents from the surface of rubber sheet.

•

Strategic Raw Materials. National Association of Manufacturers, 14 West 49th St., New York City. 6 x 8½ in. 86 pp.

This is a report of the comprehensive study recently undertaken by the Research Department of the National Association of Manufacturers on sources of supply of raw materials needed in national defense and of the measures which might be taken, by both government and industry, to insure a continuous flow of such materials. The booklet contains much valuable information on general policies concerning reserve stockpiles, reclaiming of scrap and production of synthetics. Considerable attention was, of course, given to rubber and several pages are devoted to a special report on this commodity. Other commodities discussed in the booklet include manganese, tin, chromium, tungsten, mercury and antimony.

Inventory Control Methods. Policyholders Service Bureau, Metropolitan Life Insurance Co., New York City. 8½ x 11 in. 46 pp.

This report offers many helpful suggestions in connection with inventory control methods. It is based on data contributed by a number of industrial companies that are believed to have developed sound practices of controlling inventories of supplies, direct materials and finished goods. It is not intended to cover the control of work-in-process inventories, nor does it apply to the merchandise control policies of retailers and wholesalers. The report summarizes specific advantages of a formal system of inventory control, from the financial and operating viewpoints, and outlines six basic elements which are normally part of a formal system.

•

SL-20. C. P. Hall Co., First Central Tower, Akron, Ohio. 8¾ x 11½ in. 6 pp.

Advantages of SL-20, an activator and softener, over stearic acid in various types of compounds are stressed in this laboratory report. Results on tensile, elongation and modulus of compounds containing stearic acid and SL-20, respectively, are shown in graph form. Properties and specifications of the material are given. The data shown indicates that in pure gum and mechanical type stocks stearic acid can be replaced by approximately one-half as much SL-20.

•

Industrial Chemicals. (Revised). American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City. 4 x 9 in. 42 pp.

The diversified lines of chemicals and allied products offered by American Cyanamid to industry is listed in this catalog, first alphabetically and then by industry. A data section, in which the more important applications of many of these chemicals and allied products are discussed, is also included. Lists of the company's plants, mines and quarries and district offices are given.

•

Thermometers and Hydrometers. George Ruehfel Co., Inc., 103 Menahan St., Brooklyn, N. Y. 8¾ x 11½ in. 28 pp.

The complete lines of thermometers and hydrometers offered by the company for laboratory use are illustrated and described in this new catalog. Suggestions for insuring correct hydrometer readings are given and a handy selection chart which lists hydrometers especially calibrated for more than 50 products is included. Several tables for converting specific gravity readings into pounds are also included.

•

When to Use the Graham. (Bulletin No. 501). Graham Transmissions, Inc., 2711 No. 13th St., Milwaukee, Wisconsin. 8½ x 11 in. 16 pp.

Complete data on Graham variable speed transmissions is given in this bulletin, together with illustrations and notes on typical installations. Principles of metallic traction, with explanatory curves and diagrams, are set forth in the bulletin for the first time. Applications of various types of variable speed transmissions are summarized.

•

Arsenals of Democracy. Bureau of Public Relations, Department of War, Washington, D. C. 8 x 10½ in. 32 pp.

This booklet portrays pictorially, and in terse verbal statistical descriptions, the progress made by the Ordnance Department in meeting the responsibilities of expansion placed on it by means of legislation enacted during the past year. Fifteen, of the thirty or more major projects being undertaken, are described in this informal survey, ranging from the construction of plants for making shells to those making tanks.

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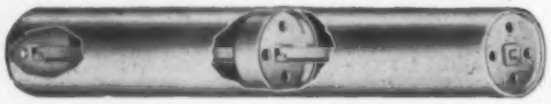

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RAINCAPES & COATS
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DOLL PANTS, CAPES, ETC.
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RAND RUBBER CO. BROOKLYN N. Y. U. S. A. MFRS.

REVIEWS (CONT'D)

Link-Belt Roto-Louvre Dryer. (No. 1911). Link-Belt Co., 307 No. Michigan Ave., Chicago, Ill. 8½ x 11 in. 24 pp.

This combination catalog and engineering data book gives valuable data on Roto-Louvre drying, and contains both photographs and drawings of typical installations. The Roto-Louvre Dryer, which is also used as a cooler, is recommended by the company for the drying of coal, ore, sand, granules, powders, pulps, starches and many other products of the mine, chemical, food and agricultural industries.

•

Watco Water Conservation Equipment. Water Cooling Corp., 71 Nassau St., New York City. 8½ x 11 in. 8 pp.

The company's line of mechanical draft cooling towers, atmospheric cooling towers, spray nozzle cooling systems and roof cooling systems is described and illustrated in this new catalog. The principle of these systems is the dissipation of the exterior solar heat which would otherwise be transferred through the building roof. Installations are said to make it possible to maintain lower inside building temperatures and reduce the cost of operation of air conditioning systems where used.

•

B-L-E Antioxidant. (Report No. 4012-1). Naugatuck Chemical Division of U. S. Rubber Co., 1230 Sixth Ave., New York City. 7 x 10 in. 8 pp.

The chemical and physical properties of B-L-E, which finds wide application as an antioxidant and flex-cracking inhibitor, are given in this booklet. Special reference to the persistence and the plasticizing action of the material is made. Its use in tire treads, inner tubes, footwear, soles and heels, and other products, is discussed, with general recommendations made. The results of physical tests are given.

•

Pentex O Accelerator. (Report No. 4012-2). Naugatuck Chemical Division of U. S. Rubber Co., 1230 Sixth Ave., New York City. 7 x 10 in. 8 pp.

Advantages of Pentex O, a powerful accelerator of the thiuram class, which has a pronounced delay in its curing action, are stressed in this booklet. Physical and chemical properties are given. In addition, several formulas and the results of physical tests are supplied. The formulas cover red inner tube stock, tire tread stock, molded stock, and 30% wire insulation.

•

Aminco Laboratory Instruments. (Catalog 41). American Instrument Co., Silver Spring, Maryland. 8½ x 11 in. 184 pp.

The wide and diversified lines of materials testing equipment and laboratory apparatus sold by the company are illustrated and described in this new catalog. Several instruments used for chemical determinations and testing in the rubber laboratory are included, as is the Aminco-Yerzley Oscillograph, used for certain mechanical determinations of rubber and rubber-like materials. Specifications are given in almost all cases.

•

Export Control Regulations and Export Control Schedule No. 1. Published by the Administrator of Export Control, Washington, D. C. 8 x 10½ in. 56 pp.

This booklet contains a list of the articles and materials which may no longer be exported from the United States except under special license, in accordance with presidential proclamation. Replicas of the various forms required are reproduced. Crude and reclaimed rubber, and scrap containing 5% or more rubber, are included among prohibited exports, as well as casings and tubes.

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, MAY 12, 1941

Crude Rubber

THE price of spot rubber on the Commodity Exchange has moved in a 238 point range since our last report, high for the period being 25.00 quoted today (May 12), and low 22.62 on April 23. As an average, the price hovered around the 23-cent mark in the last two weeks of April, moving up and down as rumors of attempts to relieve the tight shipping situation filtered through the trade. Recurring rumors from the Far East concerning Japan's intentions with regard to its publicized plans for a "Greater Asia" also served to force the price upward. In the past two weeks the price for spot has shown a definite tendency toward higher levels, climbing consistently. Although the continued lack of sufficient bottoms from the Far East was partly responsible for the climb to higher levels, continuous support by speculative interests and factory accounts also contributed to the rising market. It is believed, however, that current prices are at too high a level, especially since the problem of bottoms is being gradually solved, and lower prices are anticipated shortly. Quotations in the outside market, Exchange, London and Singapore, follow:

As of May 12

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.24⅞
July	—	@	.24¾
October-December	—	@	.24
No. 2	—	@	.24¾
No. 3	—	@	.24⅝
No. 4	—	@	.24½
Thin Latex Crepe	—	@	.25⅞
Thick Latex Crepe	—	@	.25⅞
Brown Crepe, No. 1	—	@	.24⅝
Brown Crepe, No. 2	—	@	.24½
Amber Crepe, No. 2	—	@	.24⅝
Amber Crepe, No. 3	—	@	.24½
Brown Crepe, Rolled	—	@	.23¾

Latex—

Normal, per lb., carload lots	—	@	.29 13/16

Paras—

Up-River, fine	—	@	—
Acre Bolivian, fine	—	@	—

Balata—

Brazilian block	—	@	.13

LONDON MARKET

Standard Smoked Sheets—Buyers—May 9

July-September	14	@	14¼d
October-December	14	@	14¼d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—May 12

July-September	—	@	11 5/32d
October-December	—	@	10 25/32d

Scrap Rubber

Dealers report a firm market with certain types of stock tightening up. Smaller dealers are still holding out for higher prices on various grades. Prices have increased still further on practically all grades of scrap since our last report. Current quotations follow:

(Prices to Consumers)

Auto tire peelings, ton	29.00	@	30.00
Mixed auto, ton	16.50	@	17.00
Beadless tires, ton	21.00	@	21.50
Clean solid truck tires, ton	35.00	@	37.50
Boots and shoes, ton	25.00	@	27.50
Arctics, untrimmed, ton	20.00	@	22.50
Inner tubes, No. 1, lb.	.09	@	.10
Inner tubes, No. 2, lb.	.05¾	@	.06
Inner tubes, Red, lb.	.05¾	@	.06

Reclaimed Rubber

Interest in reclaim continued at a high rate in the past few weeks, with demand experienced from practically every branch of the rubber industry. Due to increasing prices on almost all grades of scrap, prices on practically all grades of reclaim have been advanced since our last report. Reclaimers feel current prices represent good values in view of the crude rubber situation. Current quotations follow:

Shoe

Unwashed, lb.	.07	@	.07¼
Washed, lb.	.10¼	@	.10½

Tube

No. 2 (Compounded), lb.	.09½	@	.11¼
Red Tube, lb.	.10¼	@	.10½

Tires

Black (acid process), lb.	.07½	@	.07¾
Black, selected tires, lb.	.06½	@	.06¾
Gray, lb.	.09¼	@	.11¼
White, lb.	.13½	@	.14½
Truck, Heavy Gravity, lb.	.06	@	.06½
Truck, Light Gravity, lb.	.07	@	.07½

Miscellaneous

Mechanical blends, lb.	.04½	@	.05¼

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3, lb.	.35¼	@	.35½
Peeler, carded, 23/4/3, lb.	.36¼	@	.36½
Peeler, carded, 15/3/3, lb.	.33¼	@	.33½
Peeler, carded, 15/4/2, lb.	.33¼	@	.33½
Peeler, carded, 13/3/3, lb.	.32¼	@	.32½
CHAFERS			
Carded, American, 1 1/16", lb.	—	@	.35½
Carded, American, 1", lb.	.27	@	.37

Cotton

After reaching 11.64 on April 14, the price for middling uplands on the Exchange started a downward movement until it touched 11.29, low for the period, on April 24. The apathy of the market was attributed to a waiting attitude on the part of the trade regarding developments in Washington, particularly on pending legislation affecting crop loans and increased parity payments. Following the action of the House in approving without a record vote the bill providing for loans on 1941 production at 75% of parity, the price jumped sharply, from 11.47 on April 29 to 11.71 the following day. Based on the apparent determination of the Senate to increase the parity to 85%, prices during the past few days have continued upward, reaching 12.63 on May 10, high for the period. The price eased to 12.54 today (May 12), largely due to the statement by Secretary Wickard in regard to prevention of undue speculation in commodities, but higher levels are anticipated. Quotations for middling uplands on the Exchange follow:

	April 9	May 12		
	Close	High	Low	Close
May	11.16	12.34	12.24	12.29
October	11.03	12.54	12.38	12.46
December	....	12.59	12.43	12.51

Sheetings

48x40	36 in.	5.50	lb.	—	@	.06½
40x40	36 in.	6.15	lb.	—	@	.05⅞
40x36	36 in.	6.50	lb.	—	@	.05¾
48x48	40 in.	2.50	lb.	—	@	.13
48x48	40 in.	2.85	lb.	—	@	.11¼
56x60	40 in.	3.60	lb.	—	@	.10⅛
48x44	40 in.	3.75	lb.	—	@	.09⅝

Ducks

Enameling (single filling), lb.	.32	@	.34
Belting and Hose, lb.	.29	@	—
Single filling, A grade, lb.	.14	@	.14½
Double filling, lb.	.15	@	.15½

Closing Rubber Prices on New York Commodity Exchange, Inc.

"New" Standard Contract of 10 Tons

FROM APRIL 10 TO MAY 12

Date		Spot	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sales
Apr.	10	22.75	22.65	22.65	21.63	21.48	21.34	21.20	21.09	20.97	20.85	20.75	20.65	20.55	——	75
	11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	12	22.88	22.82	22.82	21.75	21.60	21.45	21.30	21.19	21.07	20.95	20.85	20.75	20.65	——	32
	13	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	14	23.12	23.05	23.05	21.95	21.80	21.65	21.50	21.39	21.27	21.15	21.05	20.95	20.85	——	43
	15	23.37	23.28	23.28	22.30	22.15	21.96	21.78	21.63	21.49	21.35	21.25	21.15	21.05	——	190
	16	23.25	23.25	23.25	22.24	22.07	21.91	21.72	21.60	21.47	21.35	21.25	21.15	21.05	——	72
	17	23.10	22.85	22.85	21.93	21.78	21.64	21.49	21.39	21.29	21.19	21.09	20.99	20.89	——	81
	18	23.00	22.75	22.75	21.95	21.80	21.60	21.40	21.30	21.20	21.10	21.00	20.90	20.80	——	110
	19	23.00	22.75	22.75	22.01	21.86	21.63	21.40	21.30	21.20	21.10	21.00	20.90	20.80	——	23
	20	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	21	23.00	22.80	22.80	22.05	21.90	21.67	21.45	21.35	21.25	21.15	21.05	20.95	20.85	——	7
	22	22.70	22.54	22.54	22.20	22.05	21.84	21.63	21.50	21.37	21.25	21.10	21.00	20.90	——	75
	23	22.62	22.45	22.45	22.10	21.95	21.77	21.59	21.39	21.30	21.20	21.10	21.00	20.90	——	63
	24	22.62	22.57	22.57	22.20	22.05	21.85	21.65	21.51	21.38	21.25	21.15	21.05	20.95	——	40
	25	22.87	22.85	22.85	22.52	22.37	22.13	21.90	21.77	21.64	21.52	21.42	21.32	21.22	——	84
	26	23.00	22.90	22.90	22.63	22.48	22.24	22.00	21.89	21.78	21.68	21.58	21.48	21.38	——	35
	27	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	28	23.12	——	23.05	22.67	22.50	22.25	22.00	21.90	21.80	21.70	21.63	21.57	21.50	——	99
	29	23.62	——	23.50	23.14	22.99	22.75	22.50	22.37	22.27	22.15	22.10	21.97	21.85	——	171
	30	23.75	——	23.65	23.30	23.15	22.90	22.65	22.53	22.41	22.30	22.25	22.12	22.00	——	180
May	1	24.00	——	23.98	23.45	23.40	23.17	22.95	22.85	22.75	22.65	22.60	22.47	22.35	22.25	106
	2	23.87	——	23.56	23.45	23.30	23.07	22.85	22.75	22.65	22.55	22.50	22.37	22.25	22.15	176
	3	24.12	——	24.13	23.98	23.83	23.55	23.27	23.16	23.05	22.95	22.90	22.77	22.65	22.55	124
	4	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	5	23.87	——	23.80	23.67	23.55	23.40	23.25	23.11	22.98	22.85	22.80	22.67	22.55	22.45	311
	6	24.25	——	24.35	24.17	24.05	23.90	23.75	23.58	23.41	23.25	23.20	23.07	22.95	22.85	147
	7	24.00	——	23.90	23.80	23.68	23.49	23.30	23.16	23.03	22.90	22.85	22.72	22.60	22.50	103
	8	24.00	——	23.96	23.88	23.76	23.55	23.35	23.21	23.08	22.95	22.90	22.75	22.60	22.50	28
	9	24.25	——	24.25	24.09	23.97	23.73	23.50	23.39	23.28	23.18	23.13	22.99	22.85	22.75	73
	10	24.75	——	24.70	24.58	24.45	24.20	23.95	23.85	23.75	23.65	23.60	23.45	23.30	23.20	108
	11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	12	25.00	——	24.80	24.72	24.60	24.32	24.05	23.95	23.85	23.75	23.70	23.55	23.40	23.30	116

CHEMICAL MARKETS

New York, May 12, 1941
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.24 @	.30
A-10	lb.	.31 @	.35
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.60
Beutene	lb.	.70 @	.75
Butyl Zimate	lb.	— @	2.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	2.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Monex	lb.	— @	2.00
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	2.15
Pipsolene	lb.	1.55 @	1.80
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
R-23	lb.	.40 @	—
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	2.00 @	2.25
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.20
Thiocarbanilide, drums	lb.	.24 @	.30
Thiurad	lb.	— @	2.00
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	— @	2.00
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	— @	2.00
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues			
Prussian	lb.	.33 @	—
Ultramarine	lb.	.11 @	.16
Browns			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.04½ @	.05
Greens			
Chrome	lb.	.21 @	.30
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¾ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¼ @	.08
Cryptone ZS-800	lb.	.07¼ @	.08
Lithopone:			
Albalith	lb.	.0385 @	.0410
Azolith	lb.	.0385 @	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05¼ @	.05¾
Rayox	lb.	.13½ @	.14¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7, bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.13½ @	.18½
Mapico	lb.	.06¾ @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow	lb.	.03175 @	—
Certified	lb.	.03175 @	—
Certified Spheron	lb.	.03175 @	—
Continental	lb.	.03175 @	—
Disperso	lb.	.03175 @	—
Dixiedensed	lb.	.03175 @	—
Dixiedensed 66	lb.	.03175 @	—
Excello	lb.	.03175 @	—
Fumonex	lb.	.03 @	—
Fumonex Beads	lb.	.03 @	—
Gastex	lb.	.03 @	—
Kosmobile	lb.	.03175 @	—
Kosmobile 66	lb.	.03175 @	—
Micronex (Amarillo)	lb.	.03175 @	—
Micronex Beads (Amarillo)	lb.	.03175 @	—
Pelletex	lb.	.03 @	—
P-33	lb.	.0475 @	—
Supreme	lb.	.03175 @	—
Thermax	lb.	.02 @	—
Wyex	lb.	.03175 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Asbestine	ton	14.00	@16.00
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	22.85	@31.50
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	50.00	@62.50
Calcene	ton	37.50	@43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00	@60.00
heavy	ton	45.00	@55.00
Clay, Aerfloted, Suprex	ton	10.00	@22.00
Crown (f.o.b. plant)	ton	10.00 @	—
Dixie	ton	10.00	@22.50
Langford	ton	— @	7.50
McNamee	ton	10.00	@22.50
Par	ton	10.00	@22.50
Witco	ton	10.00 @	—
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	24.00	@50.00
Kalite No. 3	ton	34.00	@60.00
Kalvan	ton	95.00	@121.00
Magnesium carbonate	lb.	.06¼ @	.09¾
Mica	ton	35.00	@44.00
Mineralite	ton	—	@30.00
Pyrax A	ton	6.50	@20.00
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Columbia Filler	ton	9.00	@14.00
Witco	ton	6.00 @	—
Wood Flour	ton	24.00	@25.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00 @	—
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	— @	—
Hard Hydrocarbon	ton	22.00	@42.00
Parmr, solid	ton	— @	—
Pioneer, MR, solid	ton	— @	—

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50 @	4.00
Rodo #10	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.225 @	.275
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.23 @	2.48
Nitric, 36 degrees	cwt.	5.00 @	5.95
Acids, Fatty			
Laurex	lb.	.11¾ @	.14¼
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.30 @	3.35
Soda Ash, 58%	cwt.	1.10 @	2.93
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.08 @	.08½
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber	lb.	.02¾ @	.03¾
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.54 @	.59
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	.06½
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00	@26.00
Solvents			
Acetone, pure	lb.	.06 @	.08
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.66½ @	1.17
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.38 @	.50
Ethylene dichloride	lb.	.07 @	.07½
Plastogen	lb.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.23
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09½
Turpentine, spirits	gal.	.44 @	.48
dest. dist., drums	gal.	.30 @	.35
Waxes			
Beeswax, white	lb.	.36½ @	.38½
Carnauba, yellow	lb.	.69 @	.70½
Ceresin, white, dom	lb.	.11½ @	—
Montan, crude	lb.	— @	—
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale, 122/124	lb.	.02¾ @	—
Refined, 123/125	lb.	.05¾ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Exel	lb.	1.00 @	1.02
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

MOLD LUBRICANTS

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mineralite	ton	—	@30.00
Mold Paste	lb.	.12 @	.18
Rubberol	lb.	.13½ @	.14
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.09 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.035 @	.04
Sulfur, rubber makers			
Refined (bags)	cwt.	2.35 @	—
Commercial (bags)	cwt.	2.00 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
Feb.	40,603	15,578,517	17.13	1,291	599,819	20.74	39,312
Mar.	55,517	21,845,290	17.57	975	447,460	20.49	54,542
April	66,622	26,176,442	17.54	565	252,638	19.98	66,057
May	47,559	18,511,955	17.38	821	301,914	16.41	46,738
June	51,074	20,019,581	17.50	623	295,334	21.15	50,451
July	66,931	26,426,632	17.63	100	49,828	22.20	66,831
Aug.	70,453	27,608,883	17.49	416	183,369	19.69	70,037
Sept.	75,770	29,317,540	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,332	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
Feb.	314	70,251	55	26,420	461	134,878	2,171	947,524
Mar.	365	81,181	45	20,895	542	162,493	3,376	1,473,056
April	314	65,313	50	18,289	506	176,064	3,763	1,608,156
May	289	57,578	60	20,503	495	158,713	3,584	1,523,879
June	365	74,957	47	10,977	390	146,196	2,451	1,004,007
July	262	53,058	65	20,553	336	115,599	2,281	993,411
Aug.	297	59,464	61	22,638	701	276,642	2,278	1,022,531
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,487
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

Figures on Monthly Basis

	1934	1935	1936	1937	1938	1939	1940	1941
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	54,978	64,225
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	49,832	61,016
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	50,192	66,821
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	50,103	
May	42,918	41,101	50,612	51,795	30,753	45,484	51,619	
June	40,147	36,156	52,772	51,860	32,540	48,438	46,506	
July	32,553	35,917	48,250	43,703	34,219	44,975	47,011	
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	50,234	
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	50,206	
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	56,477	
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	54,652	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	56,539	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	618,349	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	209,601	187,090	30.3	34,701

Figures on Monthly Basis

1940:									
Jan.	19,297	16,070	29.2	27,418	July	14,342	14,298	30.4	28,058
Feb.	17,992	15,370	30.8	28,603	Aug.	17,213	14,224	28.3	29,786
Mar.	17,234	15,931	31.7	28,488	Sep.	16,428	14,589	29.1	30,287
Apr.	16,568	16,298	32.5	27,558	Oct.	19,358	16,528	29.3	32,118
May	17,552	15,719	30.5	28,397	Nov.	17,689	16,042	29.4	33,143
June	16,631	14,912	32.1	29,260	Dec.	19,297	17,109	30.3	34,701
1941:									
Jan.	20,413	18,636	29.0	35,344	July	.....	.....	...	.....
Feb.	19,507	17,793	29.2	37,104	Aug.	.....	.....	...	.....
Mar.	22,006	19,149	28.7	39,861	Sept.	.....	.....	...	.....
Apr.	.....	.....	...	.....	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	.....
February	34,928	37,557	42,253	September	49,505	52,297	.....
March	43,042	44,607	48,606	October	49,854	53,807	.....
April	44,264	47,683	.....	November	47,407	49,074	.....
May	49,766	52,946	.....	December	43,807	46,413	...
June	50,133	55,459	...				
July	50,689	53,865	.....	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,564
1930	17,364,096	1934	12,255,118	1938	10,612,138
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,790,192	1940	19,378,558

1941		1941		1941	
January ...	2,032,121	May	.....	September .	.....
February ..	2,131,211	June	.....	October ...	.....
March	2,665,961	July	.....	November .	.....
April	2,682,225	August	.....	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

1939	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
Feb.	15¾	15¾	15¾	15⅜	—	15⅜	15⅞	15⅞	15¾	15⅜	15¾	—	—	16⅛	16⅛	16⅛	16⅞	—	—	16⅜	16⅜	—	16⅜	16⅜	16⅜	—	16½	16⅜	—	—	—	16
March	16⅛	16⅛	16⅛	16⅛	—	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	—	—	16⅛	16⅛	16⅛	16	—	—	15⅝	15⅝	—	15⅝	15⅝	15⅝	—	16⅛	16⅛	—	—	—	16⅛
April	15⅜	15⅜	15⅜	15⅛	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	—	—	15⅛	15⅛	15⅛	15⅛	—	—	15⅛	15⅛	—	15⅛	15⅛	15⅛	—	15⅝	15⅝	—	—	—	15⅜
May	15⅛	15⅛	16	15⅛	—	16	16	16	16	16	16	—	—	16⅛	16⅛	16⅛	16⅛	—	—	16⅛	16⅛	—	16⅛	16⅛	16⅛	—	16⅛	16⅛	—	—	—	16⅛
June	16⅛	16⅛	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
July	—	—	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
August	16⅜	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
September	16⅜	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
October	16⅜	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
November	16⅜	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
December	16⅜	16⅜	16⅜	16⅜	—	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜	16⅜
1940																																
January	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	18⅞	18⅞	18⅞	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19	18⅞	19⅜	18⅞	18⅞	18⅞	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	19
February	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	19⅜	19⅜	18¾	18¾	18¾	18¾	18¾	19⅜	19⅜	19⅜	18⅞	18⅞	—	18⅞	18⅞	18⅞	18⅜	18⅜	18⅜	18⅜	—	—	18⅜
March	18¾	18¾	18½	18½	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18⅜	18¾	18¾	18¾	18¾	18¾	18⅜	20	18½	20	20	19⅝	18⅝	18⅝	18⅝	18⅜	18⅜	18⅜	18⅜	18⅜	—	18⅜
April	18⅜	18⅜	18½	18⅜	18⅜	18⅜	18⅜	18⅜	19	19⅜	19⅜	18¾	18¾	23½	23½	23½	19⅞	20	20	20	20	19½	19½	19½	19½	19½	19½	19½	19½	19½	—	19½
May	19⅜	19⅜	20	20⅛	20⅛	19⅞	20	20⅛	20⅛	24	23½	23½	23½	24	22½	22½	22⅝	22⅝	22⅝	23	21¾	23	21	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	21	—	21
June	22	21⅝	21½	21½	21⅜	21⅜	21⅜	20⅝	20⅝	22⅜	22⅜	22⅜	22⅜	22⅜	22½	21	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜	22⅜
July	21⅝	21⅝	20½	20½	20½	21⅜	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20⅝	20½	20½	21⅜	21⅜	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝	19⅝
August	19⅜	19⅜	—	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
September	—	—	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
October	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
November	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜	19⅜
December	20	20⅛	20¼	19⅞	19⅞	19⅞	19⅞	19⅜	19⅜	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛
1941																																
January	20⅛	—	20½	20½	—	20½	20⅜	20⅜	—	20⅞	20⅞	—	—	20⅛	20	20	19⅞	19⅞	19⅞	19⅞	19¾	19¾	19⅞	19⅞	19⅝	19½	19½	19½	19⅝	19⅜	19⅜	19⅝
February	—	—	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞	19⅞
March	—	—	20⅜	21⅛	21⅝	21⅝	22	21½	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜	21⅜
April	22⅞	22⅞	22⅞	22	—	23⅛	24	24	24	24¼	24¼	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜
May	23⅝	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛	24⅛

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.62	21.14	11.57	16.07	21.21	
June	13.51	12.57	15.85	19.29	12.57	16.37	22.20	
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	
Dec.	12.98	13.28	20.91	15.41	16.05	20.01	20.76	
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 Feb.	1941 Mar.	1941 Apr.	1941 May	Day	1941 Feb.	1941 Mar.	1941 Apr.	1941 May
1	—	—	14⅛	14	16	—	—	14⅜	
2	—	—	14⅛	14	17	12⅛	14⅛	14⅝	
3	12⅞	13⅛	14⅛	—	18	12⅞	14⅛	14½	
4	12⅞	13⅞	14⅛	—	19	13	14⅞	—	
5	12⅞	13¾	—	—	20	12⅛	14¼	—	
6	12⅞	13⅝	—	—	21	13	14⅞	14⅞	
7	12⅞	13⅝	14⅜	—	22	—	—	14⅞	
8	—	—	14¼	—	23	—	—	14⅛	
9	—	—	14¼	—	24	13⅛	14½	14	
10	12⅞	13⅝	14⅜	—	25	13⅛	14½	14	
11	12½	13½	—	—	26	13⅛	14⅜	—	
12	12½	13⅝	—	—	27	13⅛	14⅜	—	
13	12½	13⅛	—	—	28	13¼	14	14	
14	12⅛	13¾	—		29	—	—	13⅞	
15	—	—	14½		30	—	—	14	
					31	—	14	—	

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600		Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046		Average for Year.	7.164	8.959	12.035	
July	7.464	8.271	12.410						

Note: No quotations were made in the London market from June 17 through June 30. Accordingly, the average for the month is based on the first eleven trading days only.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 Mar.	1941 Apr.	1941 May	Date	1941 Mar.	1941 Apr.	1941 May	Date	1941 Mar.	1941 Apr.	1941 May
1	10.90	11.48	11.73	11	11.07	—	—	22	11.11	11.35	
2	—	11.54	11.78	12	11.00	11.58	12.54	23	—	11.34	
3	10.83	11.70	12.05	13	11.02	—		24	11.09	11.29	
4	10.79	11.53	—	14	11.10	11.64		25	11.11	11.31	
5	10.81	11.58	11.97	15	11.14	11.55		26	11.15	11.34	
6	10.82	—	12.29	16	—	11.50		27	11.20	—	
7	10.87	11.51	12.34	17	10.95	11.49		28	11.35	11.34	
8	10.88	11.39	12.33	18	11.14	11.45		29	11.61	11.47	
9	—	11.40	12.59	19	11.20	11.43		30	—	11.71	
10	11.11	11.52	12.63	20	11.09	—		31	11.58	—	
				21	11.15	11.47					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	
May	8.50	9.56	10.33		Dec.	8.72	10.97	10.18	
June	8.38	9.88	10.72		Average for Year	8.66	9.46	10.40	
July	8.85	9.71	10.42						

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	1940	1941	AFLOAT 1939	1940	1941	TOTAL 1939	1940	1941
Jan.	220,727	142,368	340,857	48,210	90,285	153,169	268,937	232,653	494,026
Feb.	207,882	134,328	353,733	55,814	112,257	136,955	263,696	246,585	490,688
Mar.	201,752	142,414	373,581	55,981	113,619	140,228	257,733	256,033	513,809
Apr.	188,074	162,459		57,918	102,557		245,992	265,016	
May	187,980	161,446		54,046	109,364		242,026	270,810	
June	173,493	168,235		51,274	119,138		224,767	287,373	
July	165,450	190,222		52,990	139,629		218,440	329,851	
Aug.	152,029	213,002		66,717	141,286		218,746	354,288	
Sept.	136,824	241,358		68,310	137,033		205,134	378,391	
Oct.	119,404	259,140		100,500	166,837		219,904	425,977	
Nov.	105,205	276,943		114,044	158,095		219,249	435,038	
Dec.	125,800	318,486		91,095	145,950		216,895	464,436	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
March	23,830	3,246	25,000*	142,414	194,490
April	42,239	2,715	25,000*	162,282	232,236
May	32,731	1,743	25,000*	161,446	220,920
June	32,375	1,706	25,000*	168,235	227,316
July	36,716	1,667	25,000*	190,222	253,605
August	40,395	1,580	25,000*	212,774	279,749
September	29,069	2,559	25,000*	241,538	298,166
October	33,613	3,084	30,000*	259,140	325,837
November	33,778	3,697	30,000*	276,943	344,418
December	26,773	2,165	35,000*	318,486	382,424
1941					
January	37,163	2,151	40,000*	340,857	420,171
February	46,913	2,000*	40,000*	353,733	442,646

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
March	48,180	47,635	6,445	3,984	106,244
April	50,656	43,897	9,811	4,706	109,070
May	45,715	45,622	8,425	4,785	104,547
June	45,618	42,665	10,426	4,205	102,914
July	43,850	37,387	9,433	4,529	95,199
August	39,950	38,251	9,771	4,256	92,228
September	44,730	39,614	9,384	4,124	97,852
October	42,239	37,720	9,158	4,407	93,524
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	.....	4,124	.....
1941					
January	47,198	44,735	.....	4,329	.....
February	55,512	.....	.....	4,064	.....

(1) Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

End of: 1940	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
March	113,619	45,000	52,381	211,000
April	102,557	45,000	40,443	188,000
May	109,364	45,000	55,636	210,000
June	119,138	50,000	65,862	235,000
July	139,629	55,000	55,371	250,000
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
End of: 1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL PRINCIPAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433,841	693,055
February	599,355	445,265	565,833	479,578	429,551	694,245
March	583,318	447,856	586,666	460,723	447,472	.....
April	567,172	428,249	586,291	438,252	465,345	.....
May	541,871	413,134	568,158	429,979	470,981	.....
June	520,255	434,250	573,136	407,640	500,774	.....
July	519,074	445,782	580,654	418,639	547,708	.....
August	500,520	457,462	565,394	397,345	579,119	.....
September	493,585	470,768	551,447	396,867	631,888	.....
October	486,159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge.	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures from 1941 include total afloat plus stocks on hand in the United States, United Kingdom and Malaya.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,849	16,324
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,711	
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,875	
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,919	
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,354	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,728	15,286
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,657	
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	13,101	
Oct.-Dec.	9,310	12,066	12,855	10,495	12,098	14,165	15,670	
Total	46,686	50,182	53,386	53,485	40,293	57,508	59,156	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11,651	11,675	8,762	12,004	10,547	9,963	10,747	10,168
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,881	
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,890	
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,179	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Jan.	4,546	4,954	5,472	4,149	4,270	4,847	8,863	9,348	9,797
Feb.	4,309	4,888	5,165	3,731	4,112	4,910	9,475	10,124	10,072
Mar.	5,091	5,007	5,687	4,565	4,346	5,529	9,963	10,747	10,168

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,815	15,518
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,744	
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,469	
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,333	
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,361	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,684	14,426
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	15,003	
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,403	
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,216	
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,306	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,247	8,070
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,841	
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,950	
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,036	7,014	

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Jan.	4,097	4,260	5,168	3,943	3,805	4,527	7,932	7,490	7,733
Feb.	3,795	4,184	4,993	3,401	3,788	4,713	8,298	7,886	8,004
Mar.	4,492	4,371	5,357	4,078	4,091	5,186	8,752	8,247	8,070

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.

[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1940							
July	231,703	168,769	62,934	14,468	3,397	11,071	246,171
August	75,873	46,823	29,050	13,993	1,510	12,483	89,866
September	269,108	224,470	44,638	15,475	3,410	12,065	284,583
Oct.	493,223	421,214	72,009	21,151	7,056	14,095	514,374
Nov.	487,352	407,091	80,261	23,621	10,814	12,807	510,973
Dec.	483,567	396,531	87,036	23,364	11,653	11,711	506,931
1941							
Jan.	500,931	411,258	89,673	23,195	11,990	11,205	524,126
Feb.	485,523	394,483	91,040	23,710	10,647	13,063	509,233
Mar.	507,868	410,258	97,610	26,044	12,093	13,951	533,912

* Revised.

Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA						NETHERLAND INDIES							
	Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,135	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,382	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	400,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,235	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,179	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [3]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	537,733	88,937	23,317	17,623	25,166	43,940	64,437	2,300	9,903	7,223	17,601	4,007	1,392,604
1940:														
Jan.	26,229	54,148	7,698	1,672	1,858	2,256	5,722	5,238	185	747	1,191	1,550	389	108,883
Feb.	45,651	37,958	8,946	2,922	1,164	2,678	4,307	6,931	94	834	477	1,662	239	113,863
March	47,885	42,355	5,305	1,941	1,050	3,526	3,111	3,551	178	943	548	1,482	346	112,221
April	25,454	44,416	4,144	1,807	1,799	2,951	1,834	2,927	203	720	598	1,159	317	88,329
May	57,874	40,436	7,337	2,018	1,370	2,696	2,582	4,578	195	961	364	2,305	331	123,047
June	45,471	44,834	5,603	1,553	1,421	4,077	2,178	2,730	168	727	405	1,080	101	110,348
July	42,861	60,482	7,330	1,194	1,767	2,494	4,253	4,045	169	800	342	1,035	443	127,215
Aug.	45,872	45,078	8,139	1,332	1,593	2,640	4,545	7,337	285	800	308	1,233	327	120,729
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,866	2,434	2,085	2,445	2,137	9,058	250	800	750	2,103	250	126,575
Feb.	27,414	42,275	4,346	2,491	1,686	2,922	4,137	5,000	200	800	750	1,500	250	93,781

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,685	5,584	6,393	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	37,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,290	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,321	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1939:															
May	45,390	7,531	4,646	8,413	3,006	4,438	1,573	2,000*	1,188	792	518	1,654	200*	618	81,967
June	33,951	8,439	4,649	8,190	2,423	3,067	1,992	2,000*	1,308	621	672	2,703	200*	487	70,702
July	36,932	4,040	4,282	8,437	3,164	3,668	1,408	1,000*	1,422	859	565	824	200*	412	67,155
Aug.	38,319	2,044	4,000*	....	2,033	3,145	1,500*	2,000*	2,182	952	651	1,546	200*	400*	58,972
Sept.	36,197	4,406	4,000*	....	2,639	9,254	1,500*	2,000*	875	108	222	1,200*	200*	...	62,601
Oct.	39,735	8,530	5,000*	....	5,787	2,749	1,500*	2,000*	1,235	519	653	1,200*	200*	...	69,108
Nov.	41,478	10,500*	5,000*	....	1,709	5,104	1,500*	2,000*	1,200*	667	613	1,200*	200*	...	71,171
Dec.	70,302	5,200*	5,000*	....	3,025	3,961	1,500*	2,000*	1,200*	1,035	1,827	1,200*	200*	...	96,450
1940:															
Jan.	71,565	450	5,000*	....	5,047	4,540	1,500*	2,000*	1,921	891	682	1,200*	200*	....	....
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	..
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	..	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	25,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	8,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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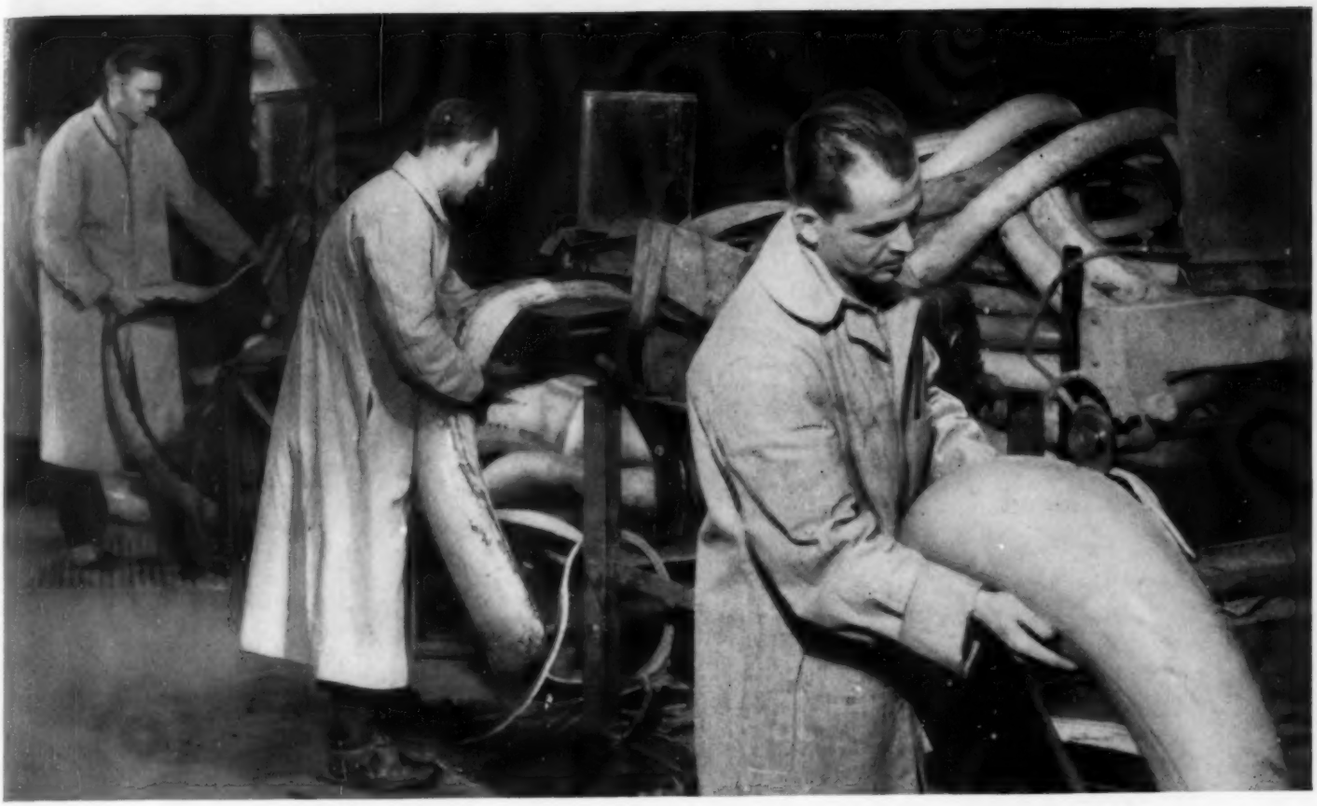

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